

**Deanship of Graduate study
Al-Quds University**



**Perception of the effects of critical nurses' long working
hours on Vigilance and Patients` Safety in Ramallah
district**

Amal Atiyeh Najib Ibrahim

M.Sc Thesis

Jerusalem- Palestine

2018/1439

**Perception of the effects of critical nurses' long working hours
on Vigilance and Patients` Safety in Ramallah district**

Prepared By:

Amal Atiyeh Najib Ibrahim

**BSc Health Service Administration –Jordan University of
Science and Technology- Jordan**

Supervisor: Dr. Moahmmad Shaheen

**A Thesis Submitted to the Graduate School in Partial
Fulfillment of the Requirements for the degree of Master of
Health Policy and management/School of Public Health. Al-
Quds University**

1439/2018

Al-Quds University
Deanship of Graduate Studies
Public Health Program



Thesis Approval

**Perception of the effects of critical nurses' long working hours on
Vigilance and Patients` Safety in Ramallah district**

Student name: Amal Atiyeh Najib Ibrahim

Registration No: 1610397

Supervisor: Mohammed Shaheen,

Master thesis submitted and accepted, Date: 28 / 4 / 2018

The names and signatures of the examining committee members are as follows:

1- Head of Committee: Mohammed Shaheen,

Signature

2- Internal Examiner: Dr. Motasem Hamdan

Signature

3- External Examiner: Dr. Hussein Jabareen

Signature

Jerusalem-Palestine

1439 – 2018

Dedication

For my parents *Mr. Atiyeh Ibrahim and Ms.Iman Abu Taha*, who gave me help and support through my life. For my beloved sisters and brothers, all in their own special way had made my life full and made this work possible.

Amal Atiyeh Najib Ibrahim

Declaration

I certify that this thesis submitted for the degree of Master, is the result of my own research, except where otherwise is acknowledged, and that this study (or any part of the same) has not been submitted for a higher degree to any other University or institution

Signature:

Amal Atiyeh Najib Ibrahim

Date: 28/4/2018

Acknowledgements

First of all, I would like to thank my family. Throughout the years abroad, my family provided me support and encouragement. This made me realize that my family is the most important part of my life.

I am really thankful to all nurses who participated in the research and provided data for my dissertation work. Also, I would like to thank all the people who helped, advised and encouraged me during my progress throughout my Master journey.

A special thanks to my advisor Dr. *Mohammad Shaheen*. Thanks for believing in me and accepting me as one of your students. I would like to thank him for his patience during classes, meetings and discussions. I thank him for answering my questions and directing me to become a better Administrator. Working with *Dr. Shaheen* did not only make me better on the professional level, but also on a personal one. I am glad that I got to be his student; it will be always my honor. Thank you is the least I can say to *Dr. Shaheen* to show my appreciation for everything he has done for me.

I am grateful to Dr. *Motasem Hamdan*, the Dean of Public Health Faculty, for his enormous support, guidance and encouragement during my thesis. Dr. Hamdan was always available when needed and his advice was always on point.

I would also like to thank ; Dr. *Asma Imam* for helping me understands the aspects of my project, in addition to her valuable input on the management aspects.

Thanks to Dr. *AbdulMuhsen Abu Fanoneh* for being a great valuable professor, for his advice, directions, and encouragements.

I highly appreciate Dr. *Yaseen Hayajneh* for reviewing my dissertation, as his inputs were very useful. I also learnt a lot from him.

Big thanks and love goes to my friends *Mai al Othman* , *Maryam al Shamsi* , *Dalia Khashgari*, *Najla Ali* , *Wafaa Salah* and Rana Kamal who supported me in the different and hard moments during my study, for their continues reassurance , motivation and friendly support.

Abstract

Working for long hours favors increasing of daytime sleepiness and decreasing the state of nurse's vigilance, offering a greater risk of injuries and work accidents that affect the quality of nurse's performance and patient's safety (Seitz, 2016).

Nurses who work in this setting may experience decreased ability to provide optimum care to patients. Thus, for enhancing and improving nurses' performance and patients' safety, there is a need to better understand fatigue and sleepiness and their association with each other as well as performance and patient's safety (Weinstein, 2016).

The study assesses the effects of long working hours of nurses in critical care units on vigilance and patients' safety in Ramallah city. The study was conducted at two major hospitals Palestine Medical Complex and Al-Istishari Arab Hospital at the first quarter of 2018. A cross-sectional design was used. A structured questionnaire was used to collect data. A total of 233 critical care nurses were included in the study, the response rate was 78.5%.

The study assessed four domains: level of vigilance during the long working hours, Patient safety level during the long working hours, Patient Safety /Frequency of Events Reported and Duties affected by vigilance and patients' safety. Study findings shows that the nurses reported a relatively high prevalence degree of long working hours (42.61%).

Also, the study finds a real significance difference between working more ≥ 12 daily, ≥ 40 h /weekly and vigilance and, no relationship between long working hours and patient safety were recorded ($p=.737$).

On the other hand, age, gender, current position and place of work shows no significance relationship with vigilance and patient safety. Finally, a significant difference between level of nurses vigilance were found between the two hospitals, and nurses at Palestine Medical Complex were more alert. The study suggested the nurses to get as much sleep as possible before starting long working hours improves their performance, prevents fatigue and keeps them alert and vigilant. Limiting consecutive long working days to a maximum of 4 days and making sure there is adequate rest time between successive shifts.

إدراك ممرضي أقسام الرعاية الحرجة لآثار ساعات العمل الطويلة على يقظتهم و سلامة المرضى

إعداد: أمل عطية نجيب إبراهيم.

إشراف: د. محمد شاهين

الملخص:

يفضل الكثير من الممرضين العمل لساعات طويلة و الذي ينتج عنه زيادة النعاس أثناء النهار وتقليل حالة يقظتهم ، مما يزيد من خطر الإصابات وحوادث العمل التي تؤثر على جودة أدائهم وسلامة المرضى. قد يعاني الأشخاص الذين يعملون في هذه المناوبات من قدرة منخفضة على توفير الرعاية المثلى للمرضى. وبالتالي ، لتعزيز وتحسين أدائهم و سلامة المرضى، هناك حاجة إلى فهم أفضل للعلاقة بين الإرهاق و قلة النوم و قلة الإنجاز مع سلامة المرضى.

إن هدف هذه الدراسة تقييم آثار ساعات العمل الطويلة على يقظة ممرضي أقسام الرعاية الحرجة و سلامة المرضى في منطقة رام الله. أجريت الدراسة في مستشفيين رئيسيين ، مجمع فلسطين الطبي ومستشفى الإستشاري العربي في الربع الأول من عام 2018. تم تطوير الاستبيان لجمع المعلومات من المشاركين. تم إختيار (233) ممرض للمشاركة في هذه الدراسة و بلغ معدل الإستجابة 78.5 %.

قيمت الدراسة أربعة مجالات: مستوى اليقظة خلال ساعات العمل الطويلة ، ومستوى سلامة المرضى خلال ساعات العمل الطويلة ، وسلامة المرضى / تكرار الأحداث التي تم الإبلاغ عنها والمهام التي تأثرت باليقظة وسلامة المرضى. و أظهرت نتائج الدراسة أن الممرضين أبلغوا عن نسبة إنتشار عالية نسبيا لساعات العمل الطويلة التي تؤثر عليهم (42.61%).

كما توصلت الدراسة إلى وجود فرق حقيقي بين العمل لأكثر من 12 ساعة يوميا و لأكثر من 40 ساعة أسبوعيا واليقظة ولم يتم تسجيل أي علاقة بين ساعات العمل الطويلة وسلامة المرضى.

من ناحية أخرى ، لم يظهر أي من المتغيرات الديموغرافية التالية (العمر والجنس والمكان الحالي ومكان العمل) أي علاقة ذات دلالة مع اليقظة وسلامة المرضى. وأخيراً ، كان هناك إختلاف كبير بين مستوى يقظة الممرضين بين المستشفيين وكانت نسبة اليقظة المرتفعة من صالح الممرضين العاملين في مجمع فلسطين الطبي. و توصي الدراسة الممرضين بالحصول على أكبر قدر ممكن من النوم قبل بدء ساعات العمل الطويلة بالتالي يساعد ذلك في تحسين أدائهم ، تقليل الشعور بالتعب و يبيقيهم يقظين و متأهبين . أوصت الدراسة أيضا بالحد من أيام العمل الطويلة المتتالية إلى مدة أقصاها 4 أيام والتأكد من وجود وقت راحة مناسب بين المناوبات .

Table of Content

Dedication.....	4
Declaration.....	i
Acknowledgements	ii
Abstract.....	iv
List of Tables	xivx
List of figures	xivi
List of Annenex	xvi
Abbreviation	xiv
Chapter one.....	1
1. Introduction	1
1.1 Problem Statement.....	4
1.2 Justification and Significance of the study	6
1.3 Aim of the study	8
1.4 Objectives of the study	8
1.5 Research Question	8
1.6 Definition of Terms	8
1.7 Summary.....	11
Chapter Two	11
2. Literature review.....	11
2.1 Introduction	12

2.2 Shift schedule	12
2.3 Work time directive	13
2.3 Health Effects of extended working hours	15
2.3.1 Sleep	15
2.3.2 Fatigue	16
2.3.3 Vigilance.....	17
2.4 Negative effects of extended working hours	18
2.4.1 Performance.....	18
2.4.2 Accidents and injuries	19
2.5 Personal effects of extended working hours.....	20
2.5.1 Gender	20
2.5.2 Age	21
2.5.3 Personality	21
2.5.4 Prevention.....	22
2.5.5 Long working hours, nurses` vigilance and patients` safety in different healthSummary of literature	23
2.5.6 Summary.....	29
Chapter Three	30
Conceptual framework	27
3.2 Factors that affect the nurses` vigilance during long work hours.....	32
3.2.1 Individual Differences	32
3.2.1.1. Age	32

3.2.1.2 Gender	32
3.2.2 Work environment Factors	33
3.2.2.1 Long shifts (Long working hours).....	33
3.2.2.2 Behavior and lifestyle	34
3.2.2.3 Living conditions.....	35
3.3 Patient outcome	35
3.3.1 Patient's safety.....	35
3.3.2 Quality improvement.....	36
3.3.3 Patients' satisfaction.....	36
3.4 Summary.....	37
Chapter Four	35
4. Methodology.....	35
4.1 Design.....	38
4.2 Study Settings	38
4.2.1 Palestine Medical Complex	38
4.2.2 Al-Istishari Arab Hospital	39
4.3 Population.....	40
4.3.1 Inclusion Criteria	41
Exclusion Criteria.....	41
Assumption.....	42
4.5 Sample	42

4.6 Study tool.....	42
4.6.1 Description of the questionnaire.....	42
4.7 Validity	44
4.7.1 Content Validity	44
4.8 Reliability	44
4.9 Pilot study	45
4.10 Data collection.....	45
4.11 Data Entry.....	46
4.12 Data analysis.....	46
4.12.1Methods of Analysis.....	46
4.13 Ethical consideration	47
4.14 Period of the study.....	47
4.15 Study limitations.....	47
4.16 Summary.....	48
Chapter Five	49
5. Results	46
5.1 General description of sample characteristics	49
5.1.2 Second: Dependent variables.....	55
5.2 Over all Domains.....	55
5. 3 Detailed Analysis.....	55
5.3.1 Findings of the questions applied in the study	57

5.4 Nurses` demographic characteristics with regard to vigilance and patient safety.....	62
5.5 Work environment variables with regard to vigilance and patient safety	65
5.6 level of nurses` vigilance during the long working hours	68
5.7 patient safety level during long working hours through participant nurses	71
5.8 Patient Safety /Frequency of Events Reported level	74
5.9 Tasks affected by vigilance	76
5.6 Summary.....	77
CHAPTER Six.....	78
Discussion and recommendations	78
6.1 Introduction	78
6.2 Discussing the study domains	82
6.3 Recommendations	85
6.3.1Recommendations for nurses	85
6.3.2 Recommendations for heads of critical care units.....	86
6.3.3 Recommendations for future researches.....	86
6.3.4 Summary.....	86
Refrences	86
Annenx	103

List of Tables

Table title	Page number
Table 4.1: Critical Care Units Statistical Information's at PMC.	36
Table 4.2 : Critical Care Units Statistical Information's at al –Istishari Arab Hospital	38
Table 4. 3: Statistical information for the targeted hospitals	39
Table 4.4 : The internal reliability of study Domains	44
Table 5.1 : Demographic characteristics of the nurses` in the targeted hospitals	47
Table 5.2 : Characteristics of the participant work environment factors	49
Table 5.3 : Reasons for working extended shifts	50
Table 5.4 : Number of Patients assigned for each nurse	50
Table 5.6 : Nurses perception of long working hours	51
Table 5.8 : Number of incident reports during last month	51
Table 5.9 : The mean and standard deviation of the responses of the nurses` in the four study areas	52
Table 5.10: Prevalence of long working hours among nurses in Palestine Medical Complex	53
Table 5.11: Prevalence of long working hours among nurses in Al-istishari Arab hospital	54

Table 5.12: One way ANOVA comparing long working hours and patient safety	54
Table 5.13 : Mean and standard deviation for long working hours	55
Table 5.14 : Mean and standard deviation for (6-8) and (9-11) long working hours	55
Table 5.15 : Mean and standard deviation for (12-14) and (15 or more) long working hours	55
Table 5.16: LCD for weekly long working hours	56
Table 5.17: Mean, Standard deviation and P value for level of vigilance	57
Table 5.18: Comparing level of vigilance between the targeted hospitals	58
Table 5.19: comparing level long working hours with regard to Gender	63
Table 5.20: Nurses` demographic characteristics with regard to vigilance and patient Safety	60
Table 5.21: LCD between working departments	61
Table 5.22 : Mean and standard deviation of vigilance for each hospital	62
Table 5.23: Chi-square test comparing nurses` vigilance regarding place of work	62
Table 5.24: One way ANOVA comparing vigilance with work environment variables	63
Table 5.25 : Pearson correlation coefficient results for the significance relationship between long working hours and reasons for working extended shifts	64
Table 5.26: Regression coefficient comparing vigilance with regard to tasks that could affect nurses` vigilance during the long working hours	65
Table 5.27: Frequencies, Percentages, P value and the level of significance of the field	66

Table 5.28 : Frequencies, Percentages, P values and the level of significance of the field	69
Table 5.29 : Frequencies, Percentages, P value and the significance level of the field	72
Table 5.30: Frequency, Percentages, P value, and Significance Level of the Field	74

List of figures

Figure title	Page number
Figure 3.1: Conceptual framework for impacts of long working hours on nurses` vigilance and patients` safety	28
Figure 5.2: Level of vigilance among nurses in the targeted hospitals	99

List of Annexes

Annex (1):	Ethical Approval letter to Palestine Medical Complex	107
Annex (2):	Consent for conduct Research at Palestine Medical Complex	109
Annex (3):	Ethical Approval letter to Al-Istishari Arab hospital	110
Annex (4):	List of experts	111
Annex (5 A):	Questionnaire Instruction Sheet (The Arabic copy)	112
Annex (5 B):	Questionnaire (The Arabic copy)	113
Annex (6 A):	Questionnaire Instruction Sheet (The English copy)	116
Annex (6 B):	Questionnaire (The English copy)	117
Annex (7):	Summary of literature review	118

Abbreviations

Abbreviation	Explanation
IQM	Institute of Medicine
PSC	Patient Safety Culture
HRQoL	Health Related Quality of Life
PA	Physical Activity
LCD	Lowest Calculation Denominator

Chapter one:

Introduction

1. Introduction

The purpose of this chapter is to describe the problem, justification and significance of the study, research question and variables of the study.

Errors are inevitable in human life. In healthcare settings, work is complex in nature making it vulnerable to errors (Khammarnia, 2016). The Institute of Medicine (IOM) (1999) disseminated an alarming report on practitioners' errors in which most of them were preventable. IQM suggested that promoting safety necessitates changes in the culture of work setting toward recognizing errors as a guide for improvement not for blaming employees (Elsous, 2016). Safety culture is a fundamental element when seeking improvement or quality in healthcare (I bid). It is defined as shared values, attitudes and perceptions of safety within an organization toward minimizing patient harm (Davies, Nutley & Mannion, 2000).

In healthcare, safety culture has been associated with quality, safety performance, safe practices and clinical outcomes including workplace accidents, falls and medication errors. There has been increasing interest in the impact of nurse work hours on patient safety (Elsous, 2016). Work schedules have a profound effect on nurses' sleep, vigilance and performance, as well as on their safety and that of their patients (Lockley, 2007). Nurses working shifts greater than 12 hours are at significantly increased risk of experiencing

decreased vigilance on the job, suffering an occupational injury, or making a medical error (Seitz, 2016). Nurses' vigilance at the bedside is essential to their ability to ensure patient safety. Therefore, assigning increasing numbers of patients eventually compromises nurses' ability to provide safe care. Several seminal studies have demonstrated the link between nurse staffing ratios and patient safety, documenting an increased risk of patient safety events, as the number of patients per nurse increases (Clarke SP, 2008; Carayon P, 2008; Massey D., Chaboyer W., Anderson V., 2015).

Patient safety is an increasingly important topic in the healthcare fields, and the rise in numbers of patient safety incidents poses a challenge for hospital management (Brasaita, 2016). To deal with the situation, it is important to know more about health care professionals' attitudes regarding patient safety. A positive patient safety culture (PSC) is one of the most critical components to improve healthcare quality and safety (I bid). Nurse duties and responsibilities are the same during the different work shifts. However, long work duty does add distinctive challenges for nurses (Abu Ruz, 2017). Long working hours disturbs the body's circadian rhythms, which helps the body to renew and repair itself (I bid). Shift workers go to sleep when their diurnal rhythm enhances signals of wakefulness, which could cause chronic insomnia. Thus, nurses working the night shift have been found to experience various physiological, psychological and social effects which negatively impact their professional performance and personal lives (I bid).

Caring is a central element of nursing practice (Potter & Perry, 2001). Leininger (2001) and Watson (1994) developed nursing theories that espouse the primacy of caring in nursing. (Benner, Tanner and Chesla, 1996) also affirmed that caring is a primary function of the nurse (Meyer, 2005). The American Nurses Association (ANA) in (2003) stated that an essential feature of professional nursing is the provision of a caring relationship that facilitates health and healing (Ballard, 2003).

Sleep is a fundamental biological need for both physical and mental health. This period of the day is necessary for neuronal regeneration, consolidation of new memories and

formation of new synapses (Kraiem, 2016). Sleep deprivation is associated with decreased attention and vigilance, with impaired memory and decision making, slower reaction time and increased number of micro sleeps during wakefulness (Alhola, 2007). Prior investigations have demonstrated changes in vigilant attention and cognitive performance with sleep restriction and circadian Phase (Kraiem, 2016). Insufficient sleep due to long working duties is widely prevalent globally (Hafner M, 2016). These trends may be both more severe and more important in the healthcare industry, as patient safety can be directly impacted (Olds, Clarke, 2010). For nurses, the essence of activity is professional vigilance, which is the mental process that makes the informed nursing actions of assessment, diagnosis, intervention, and evaluation possible and meaningful (Meyer, Lavin, 2005). Several studies reported that extended work hours affect medical and surgical performance (Stimpfel, 2013; MILLER, 2016; Tuwairqi, Selter & Sikder, 2014). To assure the continuity of care, hospital staff is ever exposed to shift work and for some to permanent night work or double shifts, which can affect their sleep and vigilance states (Stimpfel, 2013).

Hospitals are expected to provide medical services around the clock; therefore, healthcare workers need to cover all working hours. Shift work is work that takes place outside the normal working hours during the day. It is hours worked during and outside of regular weekdays that are organized into 2-shift or 3-shift systems and include night work, rotation work and work during irregular hours (Attia, 2016).

Work hours of employees change in different shifts and shifts are in rotation. Shift work is a risk factor for many health problems. Problems occur when can't adapt his/her body's internal clock to the work schedule (I bid).

Nurses working night shifts or long duties are at risk for sleep deprivation, which threatens patient and nurse safety. Little nursing research has addressed napping, an effective strategy to improve performance, reduce fatigue, and increase vigilance (Fallis, McMillan & Edwards, 2011). The exposure to shift works and especially to long duties goes against

the circadian rhythmicity of nurses, which brings about a multitude of disruptive effects on health. In a hospital environment, such long duties are necessary to ensure the continuity of care (Ferri, 2017). Sleep and vigilance disorders related to this work mode are frequent and often pose adaptation problems (Boughattas, 2014). Little has been written about effects of shift work on job performance among nurses in Palestine (Umro, 2013). Given that the international hospital settings and the provision of health services are different than those in Palestine, it would not be appropriate to use the results of previous international studies to explain effects of shift work among Palestinian nurses (I bid). Therefore, I conduct a descriptive correlation study to assess the impact of long working hours on nurses' vigilance, demonstrate the risks to patients and reduce the circumstance of this risk.

1.1 Problem Statement

The healthcare industry is encountering a nursing shortage and aging population. Thus, nurses are exposed to excessive workload levels. Nurses usually work extended shift hours and work more hours than scheduled during a week and they do not receive enough breaks or have sufficient inter shift recovery (Doran, Jeffs, Rizk, Laporte, Chilcote & Bai, 2015). Due to these schedule and workload demands, nurses frequently suffer from sleep deprivation, poor vigilance and are fatigued (Scott, 2010). They experience daytime sleepiness and decremented alertness on duties or when driving to work or to home (I bid). Working long duties or double shifts (extended shifts) cause numerous health problems for nurses and patients (Caruso, 2014). Mistakes do occur; both errors and near miss errors are more likely to occur when nurses work twelve or more hours at a stretch. Some mistakes have resulted in serious injury or death each year (Scott LD.2008). 1.3 million Patients are injured due to errors during hospitalization and more than 100.000 deaths due to preventable adverse events (I bid.). Human errors in critical care units are more significant because these patients are seriously ill and exposed to more medications and treatments (I bid).

Moreover, critical care nurses work long hours (I bid.). The Severity of errors in Critical care units is as severe as approximately one fifth of medication errors are potentially life

threatening, almost half are clinically important enough to warrant additional life sustaining treatments and the rate of preventable adverse drug events in critical care is nearly twice the error rate in non critical care settings (I bid.).

Nurses who work in this setting may experience decreased ability to provide optimum care which affects their ability to provide maximum care to patient and increase the occurrence of errors during the work shift, falling sleep and drowsiness at work according different shifts affects the nurse's performance and patient's safety (Caruso, 2014). Thus, for enhancing and improving nurses' performance and patients' safety, there is a need to better understand fatigue and less sleepiness and their association with each other as well as performance and patient's safety (Weinstein, 2016). In addition, the researcher chose both nurses vigilance and patient's safety to investigate because vigilance captures the effect on the nurse as an individual and patient's safety captures the outcomes. Specifically, patients safety demonstrates nurses' perception of how well safety culture is established in their hospital (Sammer, 2011), while vigilance shows nurses' perception of their own performance (Barker & Nussbaum, 2011). Palestinian nurses face many challenges in their daily work due to decreased chances of job advancement and emotional exhaustion which may lead to poor vigilance, poor performance and job dissatisfaction (Abushaikha, 2009). High level of occupational stress in Palestinian hospital nurses led to low job satisfaction and organizational commitment (Hajjaj, 2007), and is reflected in the performance of nurses and could be detrimental to patients' lives particularly in emergency cases (Saada , 2003). Under the above mentioned nature of Palestinian critical care nurses, long working hours have been a regular and indispensable norm of work in health care sector in the Palestinian society because of the nature of the service provided by this sector (Abu Amshah, 2014). In the sequel, it is worthy to highlight the aspects related to long working hours and problems in Palestinian nursing vigilance and patient safety and to find solutions for them (I bid). My research problem is lack of data on the impact of Palestinian nurses working long hours on their level of vigilance in order to demonstrate working pattern of critical care nurses and its effect on patients care (Caruso, 2014).

1.2 Justification and Significance of the study

Efficiency and effectiveness of nursing work have been considered as two important dimensions of the quality of health care services. The responsibility of all nurses to ensure the safe and reliable administration and documentation of medicines, to monitor and respond promptly to any adverse effects (Murphy, Timmins, 2010). The critical care units nurses provides the bulk of care to patients with oftentimes unstable conditions, must be alert to subtle changes in patients' conditions, perform accurate clinical assessments and respond in an expedient manner (Scott LD,2008). It is imperative that nurses are personally vigilant about medication management in the critical care units to prevent, detect and deal appropriately with any errors that do occur in order to improve patients' safety to be fit with quality improvement system (Cope, Nelson & Patterson, 2008).

The 12-hour shifts favored by many nurses and frequent overtime are associated with difficulties staying awake on duty, reduced sleep times and nearly triple the risk of making an error (Stimpfel, Sloane, 2012). The most significant elevations in the risk of making an error occurred when nurses worked longer than 12.5 hours (I bid). Working more than 40 hours per week (overtime), working extended shifts (more than 8 hours) and working both extended shifts and overtime can have adverse effects on nurse's health (Olds, Clarke, 2010). Extended shifts have been associated with increased musculoskeletal injuries, more cardiovascular symptoms, the development of hypertension and higher risks for injury (I bid). Working overtime has also been associated with poorer perceived health, increased neck and musculoskeletal discomfort, increased risk for preterm birth, diabetes and cardiovascular disease, as well as increased morbidity and mortality and higher rates of accidents (I bid). More specifically, long working hours related job physical and mental problems are appeared in Palestinian nursing according to various shift schedules (Abu Amshah, 2014). The above mentioned health problems clearly reflect suffering of nursing in Palestine due to the difficult work conditions (I bid). Work related stress and vigilance are considered as very influential factors because nurses have to provide throughout the day and this force them to adopt shift work system in three consecutive shifts daily (Ibid.). Several studies examined both long negative effects of shift works in nurses in private and

public hospitals in Palestine (I bid.). These problems will be addressed in our study in order to come up with some recommendations for reducing/ eliminating such problems among Palestinian nurses (I bid).

The researcher proposes that the results of this study may be significant for nurses who presently work in critical care units, those who aspire to work in night shifts, double shifts or long duties and those who may work in nursing managerial positions. Nursing leadership can use the results of the study to inform nurses about the perceived challenges faced by patients in critical care units. Caring for different cases of patients and institute changes in policy and practice that improves the nurse's performance and patient's safety.

The researcher proposes that this study represents a baseline about effects of long working hours on Palestinian nurse's vigilance and patient's safety in critical care units. The study investigates the impact of long working hours on nurse's vigilance and patient's safety in Ramallah District of Palestine, will be one of the core components in health care services quality managements. Additionally to provide recommendations to policy makers to adopt the recommendations of this study in order to improve nurse's duties as one of quality improvement procedure provided to the population in Ramallah District of Palestine. Moreover, the study may provide tentative guidelines for other researchers to conduct further studies in this field.

This study conducted in congruence with the time of development of the patient's safety and quality of health care services` guidelines .Therefore, the result might be adopted and embodied in the quality of health care system. This study may help healthcare organizations to better understand the level of significant changes in nurses' vigilance and patient's safety by making policies/decisions to change the level of fatigue and sleepiness among them. At last, safety is a social context and this study could provide a framework for an understanding of the Palestinian patients` safety. Up to my knowledge, this is the 1st study of its kind to talk about this issue in Palestine.

1.3 Aim of the study

The aim of the study is to assess the effect of long working hours on critical care nurse's vigilance and patient's safety.

1.4 Objectives of the study

The objectives of this study are:

- To describe the work patterns of critical care nurses in the target hospitals
- To assess the effects of long working hours on the critical care nurses' vigilance and patients' safety.

1.5 Research Question:

This study attempts to answer the following main questions:

- 1- What is the prevalence (percentage) of long working hours among nurses working in critical care units in the target hospitals?
- 2- Is there a significant relationship between long working hours and patient's safety?
- 3- Is there a significant relationship between long working hours and nurses vigilance?
- 4- Is there a relationship between the difficulties faced by the nurse to stay awake and patients' safety?
- 5- Are there differences on the levels of nurses' vigilance at Palestine Medical Complex and Al-Istishari Arab Hospital?
- 6- Explore possible association between background variables and nurses' vigilance and nurse's perception of patient safety?

1.6 Definition of Terms

1- Long working hour's

- Conceptual definition: work that takes place on a schedule outside the traditional 9 am – 5 pm day (when nurses work longer than 12, 14 or 16 hours per day, or when they worked more than 40 hours per week.); it can involve evening or night shifts, early morning shifts, and rotating shifts.
- Operational definition: work hours will be divided into three categories:
 1. ≤ 8.5 hours : shift duration of ≤ 8.5 hours categorized as normal working shift

2. >8.5 to <12.5: Shift durations of 8.5 hours to 12.5 hours categorized as typical working hours
3. ≥ 12.5 : If the nurse work >12.5 hours this will be considered Long working hours (Scott, 2008).

2- Vigilance

Conceptual definition of vigilance is defined in three ways: (1) one phenomenon that frames harm in a broader context, has the potential to reduce errors, and involves patients in their own care. According to Kookan (2008), vigilance is the degree to which an interactive (between persons) process of knowledgeable watchfulness exists in healthcare in response to threats. Nurse vigilance appears related to patient satisfaction and safe outcomes for patients (Ebright, Patterson, Chalked & Render, 2003).

(2) The state of watchful attention of maximal physiological and psychological readiness to act and of having the ability to detect and react to danger (Hirter & Van Nest, 1995)

(3) Cognitive behavioral outcomes that focus on the ability and inability to remain alert at work without drowsiness (Gray, Grove, Burns, 2013).

Operational definition: Vigilance will be assessed by estimating the frequency of episodes of drowsiness and episodes of sleep during the work hours (24 hrs) (Gray, Grove, Burns, 2013).

3- Patient safety

Conceptual definition: patient safety is defined as “The prevention and mitigation of harm caused by errors of omission or commission that are associated with healthcare and involving the establishment of operational systems and processes that minimize the likelihood of errors and maximize the likelihood of intercepting them when they occur (IOM, 1999).

Operational definition: The frequency and magnitude of avoidable adverse events experienced by patients (WHO, 2012). This would be evaluated by reporting the occurrence of an adverse event or a near miss event during the work shift.

Near miss: A potentially adverse event that was intercepted and prevented in a timely manner prior to producing patient harm.

Adverse event: Incident or injury associated with health care or services provided (Tran & Johnson, 2010).

Nurses perception of patient safety

Operational definition: Perception: was defined as how nurses' perceive (beliefs and attitudes) the importance of patient safety in their clinical setting. Perception of patient safety stems from nurses cognitive ability, which can impact the tasks related to achieving safe results while working and is a meaningful factor for estimating safety performance (Anderson, 2004). Also, the following questions can measure the nurses' perception of patient safety: (patient safety could be improved with clear reports received from the previous shift nurse, I always wear a face mask if i have flu to protect patient safety, To prevent patient falling i always ask for help, I usually check the bed rails if they're locked to prevent patient fall during the patient transition, I usually change patients' position every two hours, Improper hand washing always spread nosocomial infection among patients, and I wash my hands before and after giving care to each patient).

4- Difficulties to stay awake

Conceptual definition: defined as hypersomnia, which means "too much sleep." If you have hypersomnia, you have difficulty staying awake when you want to and try to. You may sleep 10 hours at night, but still be unable to stay awake during the day (University of Rochester medical center, 2018).

Operational definition: Questions about difficulties remaining awake while on duty include: (I fall asleep during the extended shift, I stay awake easily, during the extend shift, I take stimulant medication, during extended shift I struggle to stay awake, Countermeasures, during break periods & use of caffeine, increase my alertness during

working 12-hour shifts, I feel sleepy (less vigilant) by the time i start the extended shift and Iam more likely to feel sleepiness, and reduced performance during an extended shift).

5- Quality indicators: quality indicators are defined in three ways (1): any measure of the process, performance, or outcome of health care delivery (Medical dictionary, 2009). (2) Statistical measures that give an indication of output quality (ESS Quality Glossary 2010). (3) Standardized, evidence based measures of health care quality that can be used with readily available hospital inpatient administrative data to measure and track clinical performance and outcome (AHRQ, 2017).

1.7 Summary

Long working hours has resulted in less amount of sleep and this has proved to have a negative impact on nurses' performance. Rates of decreased vigilance, increased injury and occurrence of medical errors were increasingly happening. Patients' safety and nurses' vigilance were the two factors chosen to be investigated in this study as they determine and show the nurses' perception on patients' safety culture and their performance.

Chapter Two:

2. Literature review

2.1 Introduction

Critical care nursing focuses intensively on all aspects of basic nursing care and life support, and thus combines the essence of nursing with observation, insightful and even intuitive interpretation, and reactions to the slightest imbalance or deviation in a patient's condition (Scholtz, Nell, Poggenpoel, Chris & Myburgh, 2016). This chapter reviews the literature that clarifies different issues related to nurses' working hours. The purpose of this chapter is to discuss the current literature on the shift schedule pattern of critical care nurses and its effects in vigilance and patient's safety. It begins with the conceptualization of shift schedule. Then, health effects on vigilance sleep disturbance during work that reveals the impacts of long working hours on nurse's vigilance, nurse's health in general and patient safety. Further, it depicts different approaches of safety effects of long working hours among nurses'. After that, it summarize the studies that identify the relationship between long working hours , nurses' vigilance and patients' safety that have been conducted in different healthcare settings. The review of the current literature gives a foundation for this project. Lastly, it summarizes the central issues that have been stressed on and discussed in the literature

2.2 Shift schedule

Today, about one in five workers globally are employed on shift work involving night work and over one in 20 work extended hours. Shift systems involve periods of 6–12 hours work at a time with the shift nurses' alternating on two, three, or four shifts in any 24 hour period. The Each 24- hour day is divided into three shifts including: day shifts (07:00 to 15:00), evening shifts (14:30 to 22:00) and night shifts (22:00 to 07:00). Nurses who work

in outpatient clinics or in administrative positions on the other hand, may have a 08:00 to 16:00 workday. Some nurses` only work on the two day shifts, some only nights, while others rotate through all three shifts with variable degrees of speed of rotation and direction of rotation. Extended hours of work are generally accepted to mean working more than 48 hours a week. This can occur on either day work or shift work due to either a high number of hours worked per day or a higher number of days worked per week. Gómez-García (2016) carried out his study on Spain, examined the relationship between the characteristics of nurses' work environments in hospitals in the Spanish National Health System (SNHS) with nurse reported quality of care and how care was provided by using different shifts schemes. Also analyzed the relationship between job satisfaction, burnout, sleep quality and daytime drowsiness of nurses and shift work.

The findings stated that shift work is needed as rotating shift nurses and night shifts nurses seemed to provide less work perception and were less confident about patient's cases and self-care. Gómez-García (2016) states that shift work is needed as rotating shift nurses and night shifts nurses seemed to provide less work perception and was less confident about patient's cases and self-care. In other study conducted by Flo (2013) on Norway , assessed if less than 11 hours off work between work shifts (quick returns) was related to insomnia, sleepiness, fatigue, anxiety, depression and shift work disorder among nurses(Flo,2013).

A questionnaire including established instruments measuring insomnia, sleepiness, fatigue, anxiety/depress and shift work disorder was administered. The study pointed that further research should needed to investigate if workplace strategies aimed at reducing the number of quick returns may reduce complaints among workers (Flo, 2013).

2.3 Work time directive

Critical decisions, highly stressful situations, and ethical dilemmas are all part of the unique environment of a critical care unit (Schultz, Nell, Poggenpoel, Chris, Myburgh, 2016). Despite this harsh reality, there are those who choose to work within this environment. In their efforts to provide quality care to critically ill patients, critical care

nurses have to face many challenges within their working environment (Drews, 2013). Nurses who work night and rotating shifts often have difficulty remaining awake on duty. Gold (2013) suggested that association might exist between alertness and errors among nurses because nurses who worked night shifts and rotating shifts reported making twice as many as errors who worked day and evening shifts (Gold, 2013). Falling asleep or drowsiness occurred between 6:00 p.m. and midnight. Although drowsiness and falling asleep on duty associated with significant greater risk of making an error, the relationship between shifts duration and difficulties remaining a wake on duty remain unclear (Scott, Rogers, Hwang & Zhang, 2008).

“Normal” hours of work are generally taken to mean a working day with hours left for recreation and rest. Rest is a night time activity and works a daytime activity (Chang, 2013).

Shift work is defined as scheduling work shifts outside the normal working hours during the day, it is hours worked during and outside of regular weekdays that are organized into 2-shift or 3-shift systems and include night work, rotation work and work during irregular hours (Atti, 2016). Shift work schedules in the medical field vary depending on a variety of conditions, including timing and length of work hours (e.g., 8-hour shifts or 12-hour shifts), fixed or rotating scheduling, duration and direction of rotation and number of consecutive days of night work (Chang, 2013).

The term may not only refer to rotating shift schedules, but also to permanent night work, as well as to schedules requiring waking up during the night to work (Chang, 2013). Shift work schedules may be characterized as:

- Permanent: when the individuals work one shift only, i.e., day or evening or night.
- Rotating: when individuals alternate between different shifts as part of their regular work schedule. Rotations that only include day and evening shifts are defined as two shift rotations, while rotations between day, evening and night shifts are defined as three-shift rotations.

- Night work: when work hours include the time period between 00:00 and 07:00. Notably, the working time may include all or part of the night and the number of nights worked per week/month/year may vary to a great extent.
- Continuous: covering all days of the week, or discontinuous. (Flo, 2013).

For example, (Ferri et al. 2016) noted that nurses with rotating night schedule need special attention due to the higher risk for both job dissatisfaction and undesirable health effects. If shift work with nights, as compared with day work only, is associated with risk factors predisposing nurses to poorer health conditions and lower job satisfaction.

2.3 Health Effects of extended working hours

2.3.1 Sleep

There is general agreement in publications that the effects of long hours of work or shift work have a deleterious effect on sleep. The most authoritative review concludes that despite considerable variation between people, sleep loss is a major effect of shift work and is most noticeable after the extended shift. The quantity of nurses' sleep may be reduced by up to 2 hours a day but there is also an effect on the quality of sleep (Akerstedt, 1999). Such sleep deficits can lead to sleepiness at work, with some data showing that inadvertent napping at work can result. This trend for shorter sleep is likely linked to several factors. Nursing staff in facilities that operate around the clock are commonly exposed to shift work and long work hours. These demanding schedules can lead to difficulties with sleep because of the need to sleep at irregular times and at times that are out of phase with circadian rhythms. Misalignment of sleep with circadian rhythms leads to difficulties with falling asleep, more arousals during sleep, and early awakenings leading to poorer sleep quality and shorter sleep duration. Also, sleep duration may be shortened by insufficient time between work shifts and the competing demands of work and personal life. Guerra (2016) suggested that nurses' may present sleeping problems while they do not have lower scores of quality of life or mood disorders (Guerra, 2016). Likely explanations may include an adaptation to their work type over time and the fact that working with children is rewarding (Ibid).

When he conduct his quantitative cross sectional and descriptive study in five teaching hospitals of a metropolitan area in Brazil, to assess sleep, quality of life and mood of nursing professionals of pediatric intensive care units, in morning, afternoon and evening shifts, and similar to this study Niu- Sh (2017) studied the differences in sleep parameters between nurses working a slow, forward rotating shift and those working a fixed day shift in medical/surgical wards of a medical center. Participants (female) were randomly assigned to a rotating shift or a fixed day shift group. This study concluded that a comprehensive understanding of the sleep patterns and quality of nurses with different work shifts leads to better management of work shifts and reduces the influence of shift work on sleep quality (Niu -Sh, 2017). Another research focused on sleep pattern and its relation with long working hours. In this context, Attia (2016) discussed the impact of shift work on sleep quality, vigilance and general health of nurses. This study indicates that there was a relationship between quality of sleep, health problems and shift rotation. It recommended that health institutions' must integrate shift work with resulting changes in staff personal lives and manages accordingly & continuously update & provide self-adaptive instructions & program (Attia,2016).

2.3.2 Fatigue

Fatigue is defined as an overwhelming sense of tiredness, lack of energy, and feelings of exhaustion associated with impaired physical and/or cognitive function (Ellis, 2008). Symptoms of fatigue include but are not limited to Conducting multiple rechecks of completed tasks, tiredness during the day, which may be compounded with vague symptoms such as a headache, nodding off while awake and difficulty awakening after adequate sleep. Long shifts lasting over 12 hours, recurrent emergency calls, and/or night work limit opportunities for adequate rest and contribute to the onset of fatigue. As work hours become prolonged or extended into the night, hostility, tension, anxiety and depression tend to increase while energy, empathy and happiness decrease. Prolonged wakefulness influenced by extended hours and night shifts impacts alertness, clinical performance, and cognitive function.

The consequences of fatigue have serious implications for patient safety and the overall wellness of nurses. Fatigue appears, at least superficially, to be the most common physiological side effect of working night shifts. Problems with fatigue are not limited to errors involving nurses and patients, but also an increased general risk to nurses. Nurses may be working 10 or 12 hour days/weeks may be scheduled for 36 or 48 hours as well as the traditional 40 hours. During the work day, the demands of the environment may cause nurses to forego breaks and lunch times and work overtime (Rogers, Hwang, & Scott, 2004). Nurses may feel frustrated in their attempts to provide quality care. These work environments may contribute to fatigue, loss of sleep due to changing work patterns, stress and other adverse consequences. Insufficient sleep is the critical link between work and fatigue (Akerstedt, 1988). Sleep deprivation, resultant fatigue and interruptions in circadian rhythm are commonly experienced by nurses performing extend shifts. Effects of fatigue on patient safety include delayed reaction time, delayed processing of information, diminished memory and failure to respond at the appropriate time, impaired efficiency and inappropriate responses (Ibid). A study conducted by Surani (2015) reported that floor and day shift nurses performed better due to good fatigue on some tasks than ICU and night shift nurses. When he linked between sleep quality, sleepiness, fatigue and vigilance in inpatient nurses setting (intensive care unit versus the general floor) and shift worked (day versus night) affect these measures. Nurses from both the ICU and floor were included in the study, completed questionnaires assessing self-reported sleep quality, sleepiness and fatigue. The study pointed that floor and day shift nurses performed better on some tasks than ICU and night shift nurses (Surani, 2015).

2.3.3 Vigilance

Vigilance defined as the ability to remain alert to multi-source stimuli over prolonged periods of time (Sauter , 2013).Vigilance in nursing refers to the constant awareness of the environment punctuated by alarms, call lights, intravenous pump alarms, and telephones while retaining the ability to immediately act on the patient's behalf (I bid). Nursing are working around the clock commonly exposed to shift work and long working hours. These demanding schedules can lead to difficulties with vigilance because of the need to sleep at irregular times. Misalignment of sleep with circadian rhythms leads to difficulties with

falling asleep, struggling to stay awake, more arousals during sleep and early awakenings leading to poorer sleep quality and shorter sleep duration.

Also, sleep duration may be shortened by insufficient time between work shifts and the competing demands of work and personal life. Poor vigilance has been associated with cognitive problems, mood alterations, reduced job performance, reduced motivation, increased safety risks and physiological changes. Extended working hours work causes sleep disturbances, excessive sleepiness, fatigue, poor concentration, poor vigilance, absenteeism, accidents, errors, injuries and even fatalities. Many requirements are requested for nurses to be vigilante during the working hours such as nursing knowledge, sustained attention and perpetual scanning (assessing) (QSEN, 2014). Therefore, nurses who fail to obtain adequate amounts of sleep are risking their own health and safety and jeopardizing patient's safety. (Smith-Miller, 2014). On other hand, Boughattas (2014) detected the harmful effects of night shift on sleep, vigilance and the quality of life of two groups of nurses' one group performing a fixed night work and the other one working permanently during the day. highlights not only the alteration of the health and the well being of paramedical staff secondary to night shift, but also a possible threat to safety care lavished by these teams, which involves the necessity to undertake preventive measures on an individual and collective scale(Boughattas ,2014).

Kraiem (2016) presented and assessed the impact of fixed night shift on the vigilance of paramedical staff, The average rate of errors evaluated at the beginning, half-time and at the end of the work has increased during 3 tests (simple task, positive and negative cueing tasks), without difference being statistically significant. Kraiem cites studies that alteration of vigilance with an ascent of the error rate among fixed night shift workers is a reality, which puts in question, not only the health of paramedical staff but also the care safety provided by these teams (Kraiem, 2016).

2.4 Negative effects of extended working hours (safety-wise)

2.4.1 Performance

Extended working hours can affect nurses' performance & patient safety, as for example, nurses who work long hours or who rotate shifts make more error from less vigilance and fatigue than do nurses on other shifts and the risk for error can increase by two to three times when nurses work 12.5 hr or more in succession. Ayed(2015) examined the influence of day, afternoon, night and rotating shifts on nurse's job performance and stress, results indicated that job performances and satisfaction was less on a rotating shift than on a fixed one. Relationship between hours worked, nurse fatigue and errors; with error rates doubling at 10 hours of work and tripling at 16 hours were identified, vigilance problems are often characterized by a decreased ability to complete work and a subjective complaint of feeling tired, Inadequate rest, sleep loss and shift work schedules (Ayed,2015). Fatigue has been reported to produce slowed reaction time, omission errors, impaired problem-solving abilities and attention lapses (Van-Griever & Meijman, 2013). Potential link between poor vigilance and performance have negative consequences such as decreased alertness and reduced job performance that could endanger patient safety and affect the quality of care at critical care units during the long working hours (Ayed, 2015). This is in consistence with a study done in governmental hospitals at west bank of Palestine which finds out that less sleepiness, fatigue and poor vigilance affects nursing performance negatively also has major effect on nurses' mental performance than physical performance (Khalil, 2016).

2.4.2 Accidents and injuries

The link between increased fatigue with lowered performance and subsequent high rates of accidents would seem logical during long working hours. Extended working shifts, might intuitively be associated with more accidents (Folkard, 2008). Extended working hours, have been related to increased sleepiness, decreased performance due to reduced cognitive and physiological functioning, and increased likelihood of nodding off or experiencing "micro-sleeps" (Banks & Dinges, 2007). These effects of shift work put nurses' at risk of accidents and injuries during work hours like needle stick, sharp injuries and also possibly on their way home from work. Accidents caused by driver fatigue or lapses of attention due to sleep deprivation are often quite severe as the drowsy and/or fatigued driver may not take the appropriate actions to avoid an accident. It was also reported that sleepy

drivers often do not perceive their risky condition and frequently drive with closed eyes for 5 to 50 second periods (I bid). This is consistence with the study done by Chien(2016) pointed out that high rates of needle stick and sharps injuries persist in hospital nurses ,The common problems of long work hours and chronic insomnia increase the risk of these injuries(Chien, 2016).

2.5 Personal effects of extended working hours

2.5.1 Gender

Long working hours can lead to an accumulation in vigilance that may increase nurses' risk of injury. With regards to gender, besides to the negative effects on fertility and pregnancy, a reduced vigilance has been observed in female nurses` facing long working hours (i.e. those with small children and/ or larger families), which make it more difficult to recover from sleep deprivation and fatigue (Uhlig, 2014). It seems that women complain of more sleepiness on shift work but the physiological basis for this is difficult to substantiate. Some of the increased difficulties that female nurses` have on shift work are related to their greater domestic obligations and to the broad based assertion that they tend to report health symptoms more often than male.

Lack of adequate vigilance or the presence of sleep disorders can greatly impact a woman's during long working hours more than men (I bid).This is in agreement with a descriptive study was conducted by Kim (2016) investigates the association between night and shift work status and (health related quality of life) HRQoL of economically active women and analyzed how marital status interplays in the objected relationship. Yinghui signify the importance of monitoring the HRQoL status of women working night and rotating shifts as these individuals may be comparatively vulnerable to reduced HRQoL (I bid).and in agreement with a study was conducted by Jaradat (2016) examines gender specific association with shift work mental distress and job satisfaction in nurses in Hebron district. Concluded that Women working shifts reported significantly higher level of mental distress than day work women but men working shift reported significantly lower of job satisfaction than men working regular day shift (I bid).

2.5.2 Age

Age of the nurses` who works extended shifts presents specific challenges when examining work schedules and vigilance. It might be proposed that shift working would be better tolerated the older the worker becomes. They might have less domestic pressures from small children, more experience of coping in general and older people seem to require less sleep than younger people (J M Harrington, 2001).

Furthermore, the older nurses may have expertise that is invaluable to the employer, there are accompanying concerns. One concern may be the health related issues that begin to appear in nurses` as they age (Heart disease, diabetes, circulatory disorders, adverse responses to menopause such as depression and migraine Headaches) sleep disorders, arthritis and a wide variety of other health issues increase with increasing age. These affect the ability of nurses to manage long work schedules. Therefore, the relationship between shift related sleep-wakefulness and age was examined in many studies (Bonnefond, 2007). Because requires attention to detail, vigilance and exacting standards of performance all of which are part of nursing practice. Bonnefond (2007) reported the most sleepiness, the middle (35-49 years old) and older (50-58 years old) groups had increased performance lapses during the night shifts (Ibid).

2.5.3 Personality

Personality was explored as an important variable in nurse's vigilance during long working hours. It has been proposed that almost one in five workers leave shift work because they cannot tolerate it, about 10% positively enjoy it, and the rest tolerate it to a greater and lesser extent (Harrington, 2001). Personality may play a part in this as there is an association between neurotic introversion and intolerance to shift work. People who are at their best in the morning face more difficulties in adjusting their circadian rhythms to night work compared with those who feel better in the evening. By contrast, evening types have greater problems with the early morning shift. Therefore, specific features of personality that affect the perception of nurses vigilance viewed from" Anxiety" as two components state anxiety, the temporary component which manifests when an individual perceives threatening demands or dangers and trait anxiety, the more stable component which may

be regarded as a personality characteristic. In congruent with the previous studies, in a study of intensive care unit nurses, the investigators concluded that individuals high on state-anxiety were not only at risk for poor vigilance, but also for making medical errors (Asefzadeh, 2013).

2.5.4 Prevention

Most of the work on minimizing the harmful effects of long working hours has concentrated on the three 8 hour shifts. As extended shifts seems to cause a disproportionate amount of the problems of shift work, extended shifts should be reduced as much as possible, perhaps by increasing the number of nurses` involved. Rapid change every few days of the rations is preferable to slow rotation as this schedule produces less interference with circadian rhythm (Spurgeon, 1997).

On balance, the duration of shift should not be extended to 10 or 12 hours as complaints of fatigue and poor alertness are greater on the long shifts, this translates to poorer performance and increased accidents is lacking. Longer shifts are favored by many nurses, not because they are longer but because the breaks between shift weeks are longer often 3–4 days (I bid).

Finally, allowing the nurses to design their own shift schedules encourages good work performance as they take responsibility for achieving the work output targets. Other factors which can upgrade working schedules include workplace improvements in catering, supervision, health care, transportation and recreational facilities (I bid). Table 2.5.5., summarizes important studies that reported in this study.

2.5.5 Long working hours, nurses` vigilance and patients` safety in different healthcare settings: Summary of literature

Author (s) /Year	Aim	Sample size	Study Design	Instruments	Results	Comments
1-Gomez Garcia et al (2016) Spain	1-Examine the relationship between the characteristics of nurses' work environments in hospitals in the Spanish National Health System with nurse reported quality of care, and how care was provided by using different shifts schemes. 2- analyze the relationship between job satisfaction, burnout, sleep quality and daytime drowsiness of nurses and shift work	635 registered nurses who worked on day, night and rotational shifts on surgical, medical and critical care units	Quantitative method	Semi-structured questionnaire	Shift work is needed as rotating shift nurses and night shifts nurses seemed to provide less work perception and were less confident about patient's cases and self-care.	This study is a well designed study that contributed to the nursing body of knowledge through identifying different coping modes with long working hours
2-Flo E. al (2013) Norway	To assess if less than 11 hours off work between work shifts (quick returns) was related to insomnia, sleepiness, fatigue, anxiety, depression and shift work disorder among nurses.	1990 Norwegian nurses	Quantitative	Questionnaire	Further research should need to investigate if workplace strategies aimed at reducing the number of quick returns may reduce complaints among workers	I agree with the study further strategies should be done to reduce nurses` job burnout regarding to fatigue, insomnia sleepiness and less vigilance

3-Ferri P et al (2016) Italy	If shift work with nights, as compared with day work only, is associated with risk factors predisposing nurses to poorer health conditions and lower job satisfaction	213 nurses working in rotating night shifts and 65 in day shifts	Quantitative study	The “Standard Shift Work Index,” were used to data collection	nurses with rotating night schedule need special attention due to the higher risk for both job dissatisfaction and undesirable health effects	Nurses` who works long dutes have difficulty in all areas of their lives inucluded health conditions and poor job satisfaction.
4- Guerra A. Len et al(2016) Brazil	This study aimed to assess sleep, quality of life and mood of nursing professionals of pediatric intensive care units, in morning, afternoon and evening shifts	168 nurses`	Quantitative study	Questionnaire	Nurses` may present sleeping problems while they do not have lower scores of quality of life or mood disorders. Likely explanations may include an adaptation to their work type over time and the fact that working with children is rewarding	Frequency of poor social role functioning, excessive daytime sleepiness and poor quality of sleep can be observed. great challenge of night workers is definitely to adapt their pace of life to their biological clock and to social coexistence
5- Niu Sh et al (2017) Taiwan	Explore the differences in sleep parameters between nurses working a slow, forward rotating shift and those working a fixed day shift in medical/surgical wards of a	Participants (female) were randomly assigned to a rotating shift or	Descriptive cross-sectional study	Questionnaire	Comprehensive understanding of the sleep patterns and quality of nurses with different work shifts leads to better management of work shifts and reduces the influence of shift work on sleep	The finding of this study will enhance the work pattern of nurses` in order to help them to control their sleep quality

	medical center.	a fixed day shift group			quality	
6-Fathia A et al (2016) Saudi Arabia	The aim of this study was to assess the impact of shift work on sleep quality, vigilance and general health of nurses	100 Saudi nurses	Descriptive cross-sectional study	Data were collected by a vigilance scale and Pittsburgh Sleep Quality Index questionnaire sheet	Results were indicates that there was a relationship between quality of sleep, health problems and shift rotation.	Findings could act as a basis for further research. Health institutions' must integrate shift work with resulting changes in staff personal lives and manages accordingly & continuously update & provide self-adaptive instructions & program.
7-Surani S et al (2015) Iran	Measure sleep quality, sleepiness, fatigue and vigilance in inpatient nurses & to assess how setting(ICU versus the general floor) & (day versus night) affect these measures	Nurses from both the ICU and floor were included in the study	Quantitative	Questionnaires assessing self-reported sleep quality, sleepiness and fatigue	Researchers found floor and day shift nurses performed better on some tasks than ICU and night shift nurses	findings can provide a framework of appropriate and effective working conditions among nurses who work extended shifts
8-Boughattas et al(2014) Tunisia	The main aim of this study is to detect the harmful effects of night shift on sleep, vigilance and the quality of life of nurses'	two groups of nurses: one group performing a fixed night	Quantitative method	Semi-structured questionnaire	Not only the alteration of health and well being of paramedical staff secondary to night shift, but also a possible threat to safety care lavished, which involves the necessity to undertake preventive	This study contributed to the body knowledge of nursing through the need to identify preventive measures to improve nurses` health in

		work and the other one working permanently during the day			measures on an individual and collective scale	general and patients` safety at all
9-Kraiem A et al (2016) Tunisia	The aim of this study is to assess the impact of fixed night shift on the vigilance of paramedical staff	92 care agents working night	Descriptive cross-sectional	Questionnaire	Alteration of vigilance among fixed night shift workers is a reality puts in question not only the health of paramedical staff but also the care safety	Higher educated nurses` about vigilance countermeasures, are more likely to work efficiently
10-Ayed A et al(2015) Palestine	To assess night shift and education / training developmental factors on performance of professional nurses in governmental hospitals in the northern region of Palestine	185 nurses	quantitative descriptive study	self administered Questionnaire	levels of night shift factor affecting performance of professional nurses was high and the education training developmental factors moderate as perceived by nurses. night shift and education/ training developmental factors affected the performance of the professional nurses	Suggestions to improve the performance of professional nurses such as: reduce the strain of long work hours on night shift .Providing continuous professional development of nurses in service training program
11-Khalil A et al (2016) Palestine	To investigate the effects of fatigue and sleepiness on nursing performance among ICU and CCU	175 nurse's	cross sectional study	Questionnaire	There is a relation between performance and sleep, between fatigue and nursing performance. Sleep and fatigue has an effect on nursing performance, therefore,	The finding of the study are guidelines for other researchers to investigate other causes affecting sleep and

					the mental performance has major effect on fatigue than physical performance. A negatively relation between fatigue and nursing performance was founded and a relation between sleep and nursing performance	fatigue of nurses and increasing the number of nurses to ensure care establish scheduling practices and policies for nursing staff
12-Chien YL et al (2016) Taiwan	To examine whether long work hours and chronic insomnia are associated with needle stick and sharps injuries among hospital nurses in Taiwan	19,386 full-time bedside nurses working in 104 hospitals across Taiwan	Quantitative	Questionnaire	High rates of needle stick and sharps injuries persist in hospital nurses in Taiwan. The common problems of long work hours and chronic insomnia increase the risk of these injuries.	Hospital managers follow regulations on work hours and optimize shift schedules for nurses to decrease related injuries
13-Yinghui Wu et al (2016) Japan	This study aimed to clarify the impact of long nurse working hours on PSC in Japan, the US, and Chinese Taiwan	The study included nurses` from USA Taiwan and Japan	Quantitative study	He Brief COPE scale; the hospital anxiety and depression scale and questionnaire	Patient safety grade deteriorated and the number of events reported increased with long working hours	Efforts should be made to coping strategies to be helpful (to reduce nurses` errors and improve patients` safety) long nurse working hours would deteriorate PSC and that the deterioration patterns would vary between countries
14- Asefzadeh s et al(2013) Iran	To identify and assess the failure modes in the ICU of Qazvin's	all individuals and owners who	qualitative-quantitative	Standard worksheet	Forty eight clinical errors and failure modes identified, results showed that the	I agree with the study finding where Many of the identified

	Social Security Hospital (Razi Hospital) through Failure Mode and Effect Analysis (FMEA).	are familiar with the process in ICU	research by Focus Discussion Group		highest risk probability number (RPN) was in respiratory care “Ventilator's alarm malfunction (no alarm)” with the score 288, the lowest was in gastrointestinal “not washing the NG-Tube” with the score 8	errors can be prevented by group members. in addition Clinical risk assessment and management is the key to delivery of effective health care
15- Jaradat et al (2017) Palestine	to examine gender specific association with shift work mental distress and job satisfaction in nurses in Hebron district	372 nurse	Quantitative study	Questionnaire	Women working shifts reported significantly higher level of mental distress than day work women but men working shift reported significantly lower of job satisfaction than men working regular day shift. Women reported higher level of mental distress than men but this was un related to work schedule.	Nurses working shifts reported higher levels of mental distress and lower levels of job satisfaction, There was no evidence of a gender differential in the association between Shift Work and mental distress and job satisfaction

2.5.6 Summary

Atypical work schedules which demands more working hours can cause reduced sleep, leading to drowsiness, fatigue, less vigilance, decline of cognitive performance and health problems among the members of the nursing staff. The issue of combating to stay awake in an effort to prevent errors is of great consequence to nurses on the long working hours. Nurses have a primary responsibility to their patients, but there is also a professional obligation that every nurse has to their coworkers. If a coworker is having difficulty remaining alert, then colleagues should offer the nurse a respite by taking over their patients for a period of time. While in the past most hospitals had a “no sleeping while on duty” stance, many health care systems have now begun taking a second look at this archaic policy. The preponderance of current nursing research indicates that a brief nap may not only allay the effects of sleep deprivation, but it may also reduce the number of errors (Caruso & Hitchcock, 2004).

Despite the increasing evidence that sustained long work hours has deleterious effects on a nurse’s health and negatively impacts social and family life, the fact remains that the hospital care cycle is 24-hours per day. Hospitals have a duty to provide safe quality care around the clock and this goal requires skilled nursing care on all shifts and available at all times. While most nurses will have the opportunity to work long working hours for a time, all nurses should be aware of the possible negative effects of this duties. They should not hesitate to protect themselves or their colleagues by using strategies which might lessen the effects of sleep disruption or less vigilance and promote a culture of safety and security for both nurses and patients (Banakhar, 2017).

Chapter Three:

3. Conceptual framework

Alertness and vigilance are required for providing good nursing care and they depend upon having an adequate duration of quality sleep and rest. Long work hours can affect the quality of nursing care and increase the potential for error. Vigilance and nurses health in general are affected by long working hours and this may be due to interactions between the work schedule (time), individual factors, such as age and gender and Contextual factors such as long working hours...etc, and therefore they have an impact on patients safety. The conceptual framework of the study is developed by the researcher and is applicable to this study because it emphasizes nurses' vigilance and the ability to cope with long working hours. (Figure 3.1 illustrates the study conceptual framework).

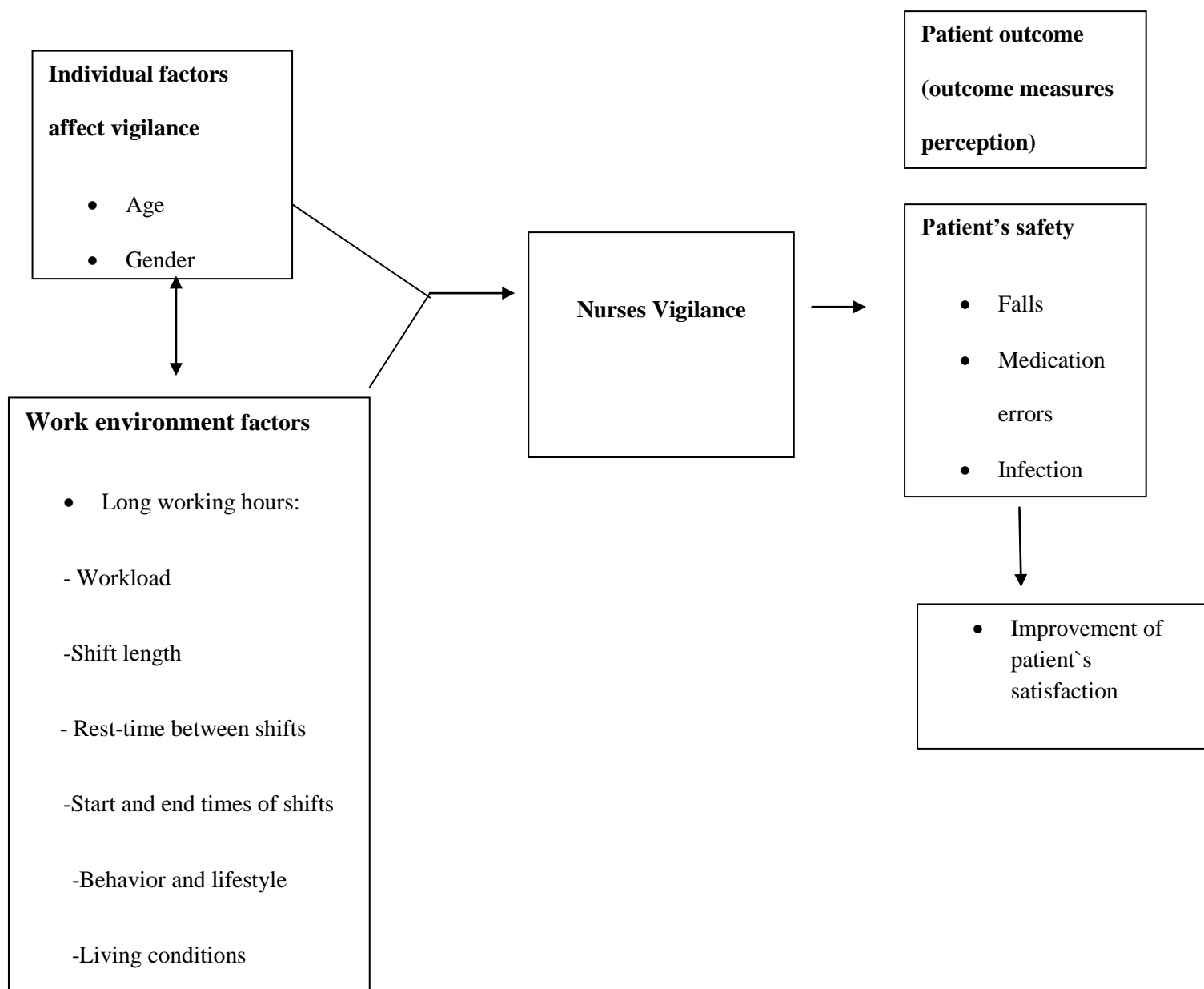


Figure 3:1 Conceptual framework for impacts of long working hours on nurses` vigilance and patients` safety

3.2 Factors that affect the nurses` vigilance during long work hours

Long working hours is not problematic for everyone. Some individuals may experience several health and sleep issues while others may manage to adapt to shift work without any immediate negative health outcomes. Individuals who experience multifaceted symptoms related to shift work (i.e., sleep problems, fatigue, less vigilance and digestive troubles) may be characterized as having poor tolerance to long working hours (Andlauer et al. 1979). Whether or not an individual has poor Sleep, work time is believed to be influenced by both individual disposition as well as contextual factors (Nachreiner, 1998).

3.2.1 Individual Differences

Sleep and health issues related to shift work may be due to interactions between the work hours and individual factors such as age and gender.

3.2.1.1. Age

There are contradicting reports concerning the effect of age on nurses' performance. Some reports suggested that older shift nurses are more likely to have shorter and disturbed daytime sleep than younger nurses. Therefore, this may lead to reduced abilities to maintain performance throughout a night shift or extended shifts and to reduced abilities to cope with consecutive working hours (Folkard, 2008). In addition, younger age is related to better sleep quality, vigilance and performance (I bid). On the other hand, other studies have reported that older nurses had better work shift performances (Saksvik, 2011). The relationship between shift related sleep-wakefulness and age was examined in many studies, and it requires attention to detail, vigilance and exacting standards of performance all of which are part of nursing practice. Bonnefond (2013) reported the most sleepiness, the middle (35-49 years old) and older (50-58 years old) groups had increased performance lapses during the long shifts (Bonnefond, 2013).

3.2.1.2 Gender

Gender variations in shift work performance may not be solely explained by physiological differences. Rather, coping techniques, responsibilities and cultural expectations also play a major role (Saksvik, 2011). Some studies have shown that female gender is related to better vigilance and higher shift work performance than male gender. There are conflicting reports about the effect of gender on shift work performance. Some studies reported no relationship between gender and vigilance during extended shifts (I bid). However, some

studies have indicated since females have more responsibilities (family responsibilities) besides work demands, this may lead to a decrease in their vigilance during the shift. In addition, there are also gender differences in disease susceptibility regardless of the work schedule. Furthermore, the onset of menopause for females causes an increase in sleep problems and decreased vigilance (Zhang & Wing, 2006).

As mentioned before, a descriptive study was conducted by Yinghui (2016) investigated the association between night and shift work status and (health related quality of life) HRQoL of economically active women and analyzed how marital status interplays in the objected relationship. Yinghui signify the importance of monitoring the HRQoL status of women working night and rotating shifts as these individuals may be comparatively vulnerable to reduced HRQoL (Yinghui, 2016)

3.2.2 Work environment Factors

Work environment factors influencing long work hours related -vigilance problems and health outcomes include various aspects of an individual's life situation such as working conditions (including work scheduling), as well as living conditions, behaviors and lifestyle choices. The effects that different types of shifts and work schedules may have on vigilance and sleepiness have already been outlined in this thesis. Additional aspects with the work organization that may affect the health and wakefulness of shift workers include: workload, length of each shift, rest-time between shifts, direction and speed of shift rotation, start and end times of shifts, as well as the distribution of rest-days (Sallinen & Kecklund, 2010). These factors place nurses at risk for fatigue and decreased vigilance, which may compromise patient care.

3.2.2.1 Long shifts (Long working hours)

Long working hours can lead to sleep problems and affect the individual's health and performance. It is currently a problem for most workers and a huge challenge for health care workers, especially for nursing staff. Changes in working periods lead to an increase in daytime sleepiness, especially for those who work the day shift and wake up too early to go to work, and those who work the night shift and sleep for a few hours or do not sleep at all (Åkerstedt, 2003). One study found that nurses who work both shifts face problems in

their vigilance and work performance (Saksvik, 2011). These extended work hours may be due to long shifts combined with overtime, shifts that rotate between day and night duties, consecutive shifts (Sallinen & Kecklund, 2010). Previous studies have suggested that social and motivational factors affect how nurses` perceive their long hours work schedule and its influence on their Health. Work motivation determines nurses` behavior and performance when providing high-quality nursing practice Therefore; positive health outcomes are contingent with the social support network (Toode, 2015).

Some schedules may entail more work hours weekends and this give higher value to free weekends resulting in possible positive response bias (I bid). In fact, low levels of social support are associated with the unhealthy state and delinquent behavior whether the nurses` are satisfied or not with and feel to have some control over their work schedule this itself have a negative impact on their health and wellbeing (I bid). This is in agreement with a study conducted at Lahore in India by Khalid (2015) assesses perceived social support and work motivation of critical care nurses who works in day and night shifts. Studying how their working shifts are associated with their work motivation. Khalid cited, that emphasize the significance of working shifts and perceived social support to the nurses` in order to provide better work motivation and patients` safety (Khalid, 2015).

3.2.2.2 Behavior and lifestyle

Lifestyle behaviors` are thought to be among underlying mechanisms, as working long hours may unfavorably change nurses' lifestyle behaviors` and consequently may increase the risk of developing chronic diseases and obesity. Physical activity (PA) is a lifestyle behavior that plays an important role in the adverse health effects of shift workers. There is some evidence that critical care nurses` who works extended shifts are less physically active compared with day nurses, they have less time and energy to be physically active during leisure time and to engage in organized team sports (Loef,2016). Observational and experimental study evaluating the association between shift work and health behavior have been conducted in South Korea by Bae (2017), that highlights that Shift work is associated with worse health behavior and targeted strategies must needed to reduce the negative health effects of shift work should be implemented, with consideration of shift workers' demographic characteristics (Bea, 2017). Moreover, transversal study conducted by

Fernandez (2015) analyzed the relationship between working hours and health related behaviors among nurses. As a result, female nurses 'showed longer domestics and total work hours than male while working professionally was higher among male nurses. Therefore, needed action for improving nurses` health promotion and the importance to assessing of the long working hours among nurses` health related behaviors (Fernandez, 2015).

3.2.2.3 Living conditions

Nurses` engaged in irregular or "atypical" working hours, such as shift and night workers, are frequently out of phase with the society, as most family and social activities. Leisure and sleep times usually assume different "values" according to social timetables: the late afternoon and evening hours, as well as week-ends are the most desirable for social contacts and leisure activities (Costa, 2016). Home living conditions influence the association between long working hours and health include domestic responsibilities and social support.

Family and marital responsibilities can be severely disrupted by shift work or long hours. Childcare, housework, shopping and leaving a partner alone at night can all lead to marital strain and family dysfunction. In line with this Al-Meri (2017) conduct his study to find out the impact of extended shifts on nurses` quality of life. Al-Meri, pointed that providing adequate off days hours is needed to enhance the sleep cycle of nurses in order to engage in family and social activities (Al-Meri, 2017).

3.3 Patient outcome

3.3.1 Patient's safety

In the health care setting, evidence indicates that sleep deprivation and fatigue in nurses who worked for long hours pose a serious threat to patient safety (Fallis, McMillan, Edwards, 2011). Furthermore, increased risk for chronic sleep deprivation in nurses may jeopardize the quality of care delivered as well as the health of the care provider (I bid). Nurses working nights or long working hours are less alert and more likely to struggle to stay awake during the latter half of the shift than nurse's whose works day or evening shifts. Long working hours have garnered much interest over the past 15 years, especially as mounting evidence points to long hours as a contributor to poor patient outcomes such

as errors and infections and poor nurse outcome such as musculoskeletal and needle stick injuries. Understanding the types of shifts and the conditions under which they are working, will enable systemic changes related to nurses' work hours within an organization to optimize patient care (Baldwin, Daugherty, Tsai, Scotti, 2003). The relationship between the vigilance of nurses who work for long hours and patients' safety has been examined in only a few empirical studies (Rosen, Gimotty, Shea, Bellini, 2008). In addition, most investigators who evaluated the safety of 12-hour shifts did not find increases in medication errors but showed that these nurses made more errors in grammatical reasoning and chart reviewing (Rosen, Gimotty, Shea, Bellini, 2008).

3.3.2 Quality improvement

Quality improvement is defined as the use of data to monitor the outcomes of care processes and the use of improvement methods to design and test changes to continuously improve the quality and safety of health care systems (QSEN, 2013). Keeping a safe environment reflects a level of nurse's empathy and vigilance for patient welfare. Knowing the causes of errors is essential to develop a system that will minimize their frequency and severity. (Stone, Hughes, Dailey, 2008). Enhancing nursing vigilance includes identification of clinically significant observations/signals/cues, calculation of risk inherent in nursing practice situations, and readiness to act appropriately and efficiently to minimize risks and to respond to threats (QSEN, 2013). Requirements for nurse vigilance include adequate nursing knowledge, sustained attention and perpetual scanning (assessment) (Ibid).

3.3.3 Patients' satisfaction

Recent literature indicates that when nurses work long hours, they are vulnerable to poor vigilance, especially those who are working overtime or picking up additional shifts. This will affect their attentiveness, behavior and communication with patients. Even if they are friendly and polite, their body language is not easily hidden from patients. Therefore, working for 10 hours or more is associated with reduced patient satisfaction (Kutney-Lee, 2009). Nurses' who work 12 hours and more cause higher levels of burnout and negatively affect patient care. According to a study by Stimpfel (2013) found that more than 80 % of nurses working shifts of eight or more hours were satisfied with the scheduling practices at their hospitals, but "the percentages of nurses reporting burnout and an intention to leave the job increased incrementally as shift length increased." Nurses who

worked shifts longer than 8-9 hours were up to 2.5 times more likely to have burnout and job dissatisfaction. Long working hours also have consequences for patients. Therefore, high proportions of nurses working long shifts, patients perceived worse care, both overall and in nursing-specific factors. Regarding that, nurses will not communicate well or respond quickly, the patients' pain will not be well controlled. For many patient outcomes, dissatisfaction increased as the proportion of nurses working longer shifts increased (Stimpfel, 2013).

3.4 Summary

A conceptual framework proposed in this chapter is the researcher's own model focusing on impacts of long working hours on critical care nurses' vigilance and patient safety. Extended working hours affect negatively nurses especially on vigilance, provide less performance, increasing errors, put patient safety at risk and leads to patients' dissatisfaction as outcome. Poor vigilance is affected by many factors such as long shifts, work load, less social and motivational support, bad life style and behavior and living condition. Reduction of long work schedules can enhance nurses' vigilance; minimize occurrence of errors and increase patients' and nurses' satisfaction. Moreover, allowing nurses to set their work schedule will reduce job burnout, increase their self esteem and motivation to work, therefore, increase patients safety culture.

Chapter Four:

4. Methodology

The purpose of this chapter is to delineate the methods used in the design of this study. The study design; population of the study, sample size determination, tools of the study, data collection, data analysis and ethical consideration.

4.1 Design

A quantitative cross sectional study using a structured questionnaire developed based on previous research found in the literature. This tool has the advantage of maximizing the number of completed surveys and allows the researcher to clarify any possible misunderstandings.

4.2 Study Settings

The study was conducted at two major hospitals (one governmental and one private hospital) in Ramallah city. Palestine Medical Complex and Al-Istishari Arab hospital purposively selected in this study. It is worth noting that various critical care units are available in both places.

4.2.1 Palestine Medical Complex

Palestine Medical Complex was officially established on 8.8.2010 as a semi-independent public institution; to provide quality health services for the people in Ramallah governorate as well as to all the Palestinian people. It is considered as a pioneer health institution in Palestine as it's located in the center of Ramallah city. It's combined of four hospitals: Ramallah Governmental Hospital, Kuwaiti Hospital for Heart Surgery, Bahraini Hospital

for Pediatrics, and Shaik Zayed Emergency Hospital. The complex offers various health services including Obstetrics and Gynecology, Preterm care, internal medicine, general surgery, cardiothoracic surgery and specialized surgeries. Critical care units include: Pediatric and neonatal ICUs in Bahraini hospital, medical and surgical ICU and cardiac care unit (CCU) in Ramallah Governmental Hospital, cardiac care unit at Kuwaiti hospital. In addition, Emergency department at Shaik Zayed hospital and Operation departments at Kuwaiti and Ramallah children`s hospitals (Palestine Medical complex, 2018).

The following table presents the most important critical care units statistics on Palestine Medical Complex

Table 4.1 Critical Care Units Statistical Information's at Palestine Medical Complex, 2018

Department	# of nurses	# of doctors	# of beds/incubators	Nurse-patient ratio/ per shift	Doctor-Patient ratio/ per shift
ICU	17	3	10	1:3	1:3
Pediatric ICU	16	4	9 incubators	1:3	1:3
NICU	16	4	6 incubators	2:6	1:6
OR-Kuwaiti	15	10	5	1:3	1:3
OR-Ramallah sons wing	7	10	5	1:3	1:3
ER	32	3	14	1:20	1:5
Pediatric-ER	4	3	5	1:2	1:2
CCU-Kuwaiti	16	6	9	1:3	1:2
CCU-Ramallah sons	11	14	8	1:3	1:3
Total	134	57	71	0.9	0.9

Source: (PMC Human resource department, 2018)

4.2.2 Al-Istishari Arab Hospital

Istishari Arab Hospital began working in 2016 with an operational capacity amounted to 100 beds as an initial operational phase. Followed by a gradual run to a larger number of beds, bringing the total number of hospital's operating beds to 330 beds. The hospital includes the following critical care units:

Emergency department: with a capacity of ten equipped beds according to the highest international standards. Emergency works around the clock and patients are welcomed by highly skilled and competent medical and nursing staff. Pediatric and Neonatal division provides special services for preterm, neonate and children of all ages in a child-friendly environment consist from 3 rooms. Adult ICU and CCU are consists of one room with a capacity of ten equipped beds. Therefore, seven specialized operating rooms were prepared for multiple surgeries, each containing the finest medical techniques for the specialization of surgeons or more such as cardiac surgery, vascular surgery, neurosurgery, brain surgery, orthopedics, endoscopy, organ transplantation and all other surgeries. (Istishari Arab Hospital, 2018). The following table presents the most important critical care units statistics on Al-Istishari Arab Hospital (Table 4.2).

Table 4.2 Critical Care Units Statistical Information's at Al –Istishari Arab Hospital, 2018

Department	# of nurses	# of doctors	# of beds/incubators	Nurse-patient ratio/ per shift	Doctor-Patient ratio/per shift
NICU	34	4	43	1:2	1:4
ER	14	5	10	1:1	1:4
OR	10	5	5	2:1	1:3
CCU	15	7	10	1:2	1:5
ICU(Adult +Pediatric)	26	3	10	1:1	1:2
Total	99	24	83		

Source: (Istishari Arab Hospital Human resource department, 2018)

4.3 Population

The general nurse's population is registered nurses, who meet the study inclusion criteria & works in critical care units in Ramallah city during the implementation of the study. The total population is 490 and the following table presents the most important statistics in the targeted hospitals (see table 4.3).

Table 4.3 Statistical information for the targeted hospitals

Hospital	Total employees	# of Nurses	#doctor	#of paramedical services	# of Pharmacists and assistants	# of Administrative employees	# of hospital beds	Occupancy Rate
Al-Istishari Arab hospital	400	190	55	31	8	49	121	60%
Palestine Medical complex	750	300	200	65	14	150	300	95%
Total	1150	490	255	96	22	199	421	

Participation in the study was voluntary and based on the nurses' ability to fill the questionnaire. A participant invitation document distributed to the nursing staff to initiate interest about the study. A brief description of the study was conducted at the time of the interview. Any questions from the participants were addressed. Participants assured that all gathered data and information strictly confidential and will not be accessed by others without obtaining prior permission from them. Moreover, participants had the right to withdraw at any time. An instruction sheet describing the nature and purpose of this study were distributed to participants. Nurses meeting the inclusion criteria were invited to participate in the study.

4.3.1 Inclusion Criteria

- 1- Critical care nurse and working in either rotating or fixed shift for at least 1 year in the studied units
- 2- Having a 2 years diploma of Nursing or higher
- 3- Not having taken sick leave for more than one month in the last 6 month period before the study

4.3.2 Exclusion Criteria

- 1- Nurse Manager or educator

4.4 Assumption

The participating nurses do not having history of special chronic diseases such as a mental disorder, severe headaches or backaches, do not have history of sleep disorder, do not take any drugs that may interfere with vigilance. Aren't Pregnant or breast-feeding women and do not have effective visual disturbances.

4.5 Sample

Two hundred and thirty three nurses, who reflect the targeted population, were enrolled in the study (134 at Palestine Medical Complex and 99 at Al-ishtishari Arab hospitals). Practically, the researcher used census method to select the participant nurses. Selection of the hospitals was according to the large number of nurses and the departments that achieve the aim of the study.

4.6 Study tool

The instrument used in this study is a structured questionnaire developed based on previous research and the researcher calculated the reliability and the validity of this tool.

4.6.1 Description of the questionnaire

The survey contains 15 questions within 32 items that acquired from two resources: questions from the first resource that garner each nurse's perspective of effects of long working hours adapted from "The National Sample Survey of Registered Nurse done by the U.S. Department of Health and Human Services Health Resources and Service Administration which is tested and valid in many studies like (Gold, Rogacz, Bock, 2008). When they used this tool to make a general assessment to measure the effects of shift work hours among nurses vigilance, and accidents related to less sleepiness in hospital nurses.

This is the description of questionnaire variables':

Gender	Age
Nursing Education	Working experience
Current position	Department
Shift type	Hospital Name &Type
Working Duration/ days and Week	Daily Working Hours
Weekly Working Hours	Reasons For Working Extended Shifts
Number Of Patients Assigned	Number Of Event Reports

The second resource adapted from a study done by (Kraiem AM et al. 2016). To measure the nurse's vigilance Daytime Sleepiness with Likert scale.

The developed questionnaire consisted of four parts:

Part 1: includes 6 items explored the requested information on demographic characteristics including gender, age, level of education, position, working experience and hospital type.

Part 2A: includes 11 items explored the nurse's perception about the effects of long working hours in their vigilance and patient's safety. It is worth mentioning that this part, the nurses were asked to express the daily and weekly average of long working hours, reasons for working extended shifts, falling sleep and the level of their performance during the shift by rating 5 points likert scale (1= Never, 2= rarely, 3=Sometime, 4=Most of time, 5= always).

Likert Relevance scale

A Likert Scale is a type of rating scale used to measure attitudes, perception or opinions. With this scale, participants are asked to rate items on a level of agreement (Bertram, D, 2016).

Once the participant has answered, numbers are assigned to the responses as shown in the table below:

Always	Most Of The time	Sometimes	Rarely	Never
5	4	3	2	1

This enables us to assign meaning to the participant. The table below shows which of nurses level of vigilance, are high (an average from 3.5-5), medium (from 2.5-3.49) and which are low (an average score less than 2.5).

Grade	Percent	Mean
Low	%50	Less than 2.5
Medium	From 50%-69%	From 2.5-3.49
High	From 70%-100%	From 3.5-5

Part 2 B: Contains one question explored the nurses` definition about, what is considered to be long working hours that could affect their vigilance if it's the same as the definition by literatures or not

Part3A:11 items explored the nurses' perception about patients' safety.

Part 3 B: includes 3 items explored the nurses` frequency of Reporting events

Part 4: Contains check list question in which the nurses were encourage to mention their perception about how the mentioned tasks could affects their vigilance and patient's safety due to extended working hours.

4.7 Validity

Validity of an instrument is considered to be important issue that have been discussed and stressed out by many researchers. Validity is defined as “the extent to which a measuring instrument measure what it is supposed to measure” (Mark, 1996). In fact, when instruments measure what they are designed for, this considered to be of great importance for their reliability and this start with conceptual relevance and simplicity of the instrument (Fagerstorm, 2000). In this study validity will be constructed using content validity.

4.7.1 Content Validity

Content validity is defined as the extent to which a test reflects the variable it seeks to measure (Holm and Liewehyn, 1986). Content validity conducted before data collection and measured in the form of expert estimates of the relevance, clarity and completeness. Therefore, it is a subjective estimate of measurement rather than statistical analysis and applied to all relevant parts of the measured area. In order to validate the instrument of this study, the researcher sent the instrument including items, dimensions and operational definitions to 5 experts' including researchers, manager and nurses asked them to estimate the relevance, clarity and completeness of each item.(See Annex 4). Criteria of 80% acceptance among experts were used. As a result, two questions were rephrased and rest showed relevance and adequacy.

4.8 Reliability

The technique of measuring variables must be reliable as this reflects the extent to which an operational definition, questionnaire, test, interview schedule or other instruments is stable and consistent (Mark, 1996). In other words, a measure is reliable if it gives the same results each time the situation or factor is measured. In this study, the statistical test

used for the internal consistency was Cronbachs` Alpha coefficient. The reliability coefficient for this study instrument as a whole was high stability for educational researcher as (0.810). Cronbachs` Alpha is considered the most general form of reliability estimates and concerned with the homogeneity of items compromising the scale (Polit and Hungler, 1999). In addition to the whole instrument reliability, Cronbachs` Alpha was computed for the instrument`s subscales. Reliability estimates ranged from moderate to high. (Table 4.4).

Table 4.1 the internal reliability of study Domains

Domain	Cronbach's Alpha	No. of items
level of vigilance during the long working hours	0.81	11
Patient Safety	0.85	11
Patient Safety /Frequency of Events Reported	0.860	3
duties affect vigilance and patients` safety	0.877	7
ALL Items	0.810	32

4.9 Pilot study

The instrument was piloted after sending for the 5 experts using a sample of 23 nurses` (10% of the total sample), from similar condition hospitals (Al-Mizan hospital as private hospital, Al-Hussein governmental hospital and Al-Makassed Islamic Charitable Society hospital). In piloting process. The researcher found some statements that needed rephrasing. Some questions were completely replaced. Result from the pilot study pointed that the questionnaire would provide the needed data to meet the objective of the study. The researcher solicited participants` comments and considered that in the questionnaire final drafting. In this pilot study, the time of completing the whole questionnaire was 12-15 minutes. The response rate was 100% and completion rate was 70%.

4.10 Data collection

The data was collected daily by the researcher and patient affairs coordinator in Al Istishari Arab hospital and head of critical care units from Palestine Medical Complex as process facilitators after participant nurses filled out the questionnaire. They were trained and prepared well on how to approach the procedure and answer the nurses` questions when filling the questionnaire as the researcher. The procedure was as follows: The targeted nurses were provided with guidelines how to answer. Then they were asked to answer the general questions about demographic characteristics. The next step was asking them to express their level about the effects of long working hours in vigilance, patient`s safety,

falling sleep and performance during the shift and their perception about how vigilance influence patient's safety due to extended working hours. The researcher found high acceptability; nurses were happy that the study conducted to reflect their perception and did it in combines' time. Average time for filling the questionnaire was 15 minutes. The collected questionnaires were checked for completeness and then built in SPSS program. The response rate was as high as (78.5%) 77% and 80% for Palestine Medical complex and Al-Istishari Arab hospital respectively. Distribution of the questionnaire was upon to the number of critical care nurses` in each department.

4.11 Data Entry

Over viewing of the questionnaire was the first step, prior to data entry. The usable number of questionnaire was 233, no questionnaires were excluded. This step was followed by designing an entry model using the computer software Statistical Package for social Sciences (SPSS). Then the coded questionnaires were entered onto the computer by the researcher.

4.12 Data analysis

The researcher analyzed the data using IBM SPSS software Statistical Package for social Sciences (version22). Frequency tables were conducted for the study variables. Means and standard deviations were computed too, then that was followed by testing reliability and validity of the instrument. Advanced statistical analysis conducted to explore the potential relationship between variables. Therefore, an independent t-test, one Way ANOVA was carried out to investigate the relationship between the independent variables with the total and sub scores of the level of vigilance.

4.12.1Methods of Analysis

The researcher extracted and analyzed the questionnaire through the Statistical Package for the Social Sciences (SPSS) software. The following statistical methods were used:

- The Cronbach's Alpha test to determine the persistence of the questionnaire items.
- Percentages, frequencies and means: This is used mainly for the purposes to find the frequency of a variable and is used by the researcher in describing the study sample.
- T-test to see if there are any statistically significant differences between two sets of data.

- One-Way-ANOVA test to see if there are any statistically significant differences between three or more sets of data.
- Pearson correlation coefficient to find a relationship between two variables or two domains.

4.13 Ethical consideration

Ethical approval was obtained from the Internal Review board (IRB) of Al-Quds University as well as from the Ministry of health (regarding Palestine Medical Complex) and from Al-Istishari Arab Hospital administration to carry out the study(Annexes 2 and 4). Instruction sheet was added to each questionnaire to maintain participants` rights (Annexes 5A ad 6 A). Every nurse had the right to refuse participation and to withdraw. Completed questionnaires were treated with high confidentiality.

4.14 Period of the study

The study was conducted in the first quarter of the year 2018. Ethical letter were sent to General Directors for both places in January 2018. Then the pilot study was conducted. Actual data were collected in Febraury2018. After that, the questionnaires were checked out for completeness and entering onto the computer within the first two weeks of March. Data Analysis was completed by the end of the end of March 2018. writing thesis by the Mid of April2018. In general, the study took nine months from it starting date.

4.15 Study limitations

There are a number of limitations in this study that deserve mention. The Time and resources are the most applicable causes for this shortcoming as the time to complete a Thesis is quite limited. It was additionally difficult to select participants because of the eligibility criteria. An additional limitation was no generalization– the study cannot be generalized - to all nurse professionals in other healthcare systems (convenience sample limited to two hospitals in one city).

Finally, the study was limited to the critical care nurses employed in two hospitals; this study does not represent all medical providers, excluding physicians, pharmacists, lab technicians therefore, this study does not represent all medical personnel who provide patient care.

4.16 Summary

The intent of this chapter was to introduce the research methodology applied in the process of data collection. There are two sources of data used in this research which become a dual of data for data validity and reliability. The first data collection consists of relevant literature. The second source of data was the filled questionnaire by nurses. The distributed questionnaire method used with nurses` was structured. The questions were multiple choices and the last question was a yes, no question. The analysis of data was carried out by SPSS version 22.

This chapter presents also the ethical approval submitted to the targeted hospitals', ethical considerations were addressed during the distribution of questionnaires with the presentation of answering guideline in order to make sure that all questions are understood.

The next chapter presents the analysis of the questionnaire. It focuses first on the general profile of our sample, then start answering the research questions to reach the study objectives.

Chapter Five:

5. Results

The purpose of this chapter is to present the results of the statistical analysis of the data. Descriptive analysis presents the characteristics and the distribution of the nurses` in both governmental and private hospitals (Palestine Medical complex and Al-Ishtishari Arab hospital). Additionally, domains analysis identifies the main dimensions of effects of long working hours on nurses` vigilance and their perception about patients` safety at Ramallah city. Finally, the relationship between the selected variables and nurses` vigilance and their perception of patient safety were tested.

5.1 General description of sample characteristics

A sample of 233 nurses` was optioned in this study showed different demographic factors. Tables 5.1 and 5.2; summarize important variables that reported in this study. Males` represented 65.2% (152) of the nurses` and females represented 34.8% (81) .Both hospitals showed higher males` nurses` percentage as 65% at Palestine medical complex and 66% at al –Istishari Arab hospital. Regarding education the highest percentage 61.4% for Bachelor degree of nurses as 64% at Palestine medical complex and 61% at al-Istishari Arab hospital. Therefore, the highest percentage of position was 65.7% for registered nurses` in both hospitals respectively 65% at Palestine medical complex and 67% at al Istishari Arab hospital. The majority were working for 8-10-hour shifts (71.7%) in evening /night shifts. All of the nurses` worked full-time in a CCU, such as (Adult ICU) (18.9%), CCU (18.0%), a pediatric ICU (6.9%), a Neonatal ICU (20.6%) and operating room (27.9%). Approximately 7.7% of the nurses reported working in the emergency department. For 36 % of the nurses worked for longer than scheduled. Although the nurses worked longer than scheduled, only (29.6%) of these were identified as more income reasons. Of these shifts

43.8% were reported as compulsory shifts and 5.6% were reported as voluntary overtime. Nurses worked for 40 h/wk (27.5%) (SD 7.80, range .844-.255).

Table 5.1 Demographic Characteristics of The Nurses` in The Targeted Hospitals

Variable		Palestine Medical Complex 134		Istishari Hospital 99		Total 233	Over all Percent
		#	%	#	%	#	%
Gender	Male	87	65%	65	66%	152	65%
	Female	47	35%	34	34%	81	35%
AGE	22-31	90	67%	69	70%	159	68%
	32-41	31	23%	20	20%	51	22%
	42-51	11	8%	10	10%	21	9%
	52 and more	2	1%	0	0%	2	1%
Education	2 years Diploma	26	19%	22	22%	48	21%
	3 years Diploma	5	4%	9	9%	14	6%
	BS of Nursing	86	64%	57	58%	143	61%
	Master Of Nursing	16	12%	10	10%	26	11%
	A above	1	1%	1	1%	2	1%
Position	Licensed Practical Nurse	34	25%	25	25%	59	25%
	Licensed Registered Nurse	87	65%	66	67%	153	66%
Department	Adult ICU	18	13%	26	26%	44	19%
	Neonate ICU	14	10%	34	34%	48	21%
	Pediatric ICU	16	12%	0	0%	16	7%
	Emergency	4	3%	14	14%	18	8%
	Operating Room	55	41%	10	10%	65	28%
	CCU	27	20%	15	15%	42	18%
Experience	From 0-2	30	22%	28	28%	58	25%
	From 3-5	60	45%	38	38%	98	42%
	From 6-8	24	18%	11	11%	35	15%
	9 and more	20	15%	22	22%	42	18%

The table indicates that male nurses had the highest percentage with (65.2%), followed by female nurses with (34.8.2%).The nurses, who age were between 22-31 got the highest percentage (68.2%), followed by the ages 32-41 with (21.9%). While the lowest ages were 52 or more with a percentage (0.9%). According to nursing education level, nurses showed a wide range in level of education they attained. The nurses with BS of nursing had the highest percentage with (61.4%) followed by those with a 2 year diploma (20.6%) and nurses who had higher degrees have the lowest level with (0.9%). With regard to years of experience at critical care units, nurses who have been working for 3-5 years got the highest percentage (42.1%), followed by those who`s worked for 0-2 years (24.9%) while 9 or more years have the lowest percentage of (18.0%).

This table indicates that registered nurses have the highest percentage with (65.7%) followed by Practical nurse with (25.3%) and the director of nursing have the lowest percentage with (0.4%).

It could be noticed from this table that Palestine Medical complex have the highest percentage of critical care nurses with (57.5%), followed by Al-Istishari Arab Hospital have got (42.5 %.). This distribution is consistent with the number of critical care units for each hospital indicating that Palestine Medical Complex has a higher number of critical care units and nurses than the other hospital.

According to the critical care nurses by department. It can be seen that the highest percentage was for Operating Room with (27.9%) followed by Neonate ICU with (20.6%), then Adult ICU (18.9%) and Emergency Department has the lowest percentage (7.7%).

Table 5.2 Characteristics of The Participant Work Environment Factors

Variable		Palestine Medical Complex		Istishari Hospital		Total 233	Overall Percent
		#	%	#	%	Total #	%
Shift	Day/Evening	38	53.5	33	46.5	71	30%
	Evening/Night	58	61.1	37	38.9	95	41%
	Straight day	21	65.6	11	34.4	32	14%
	Day/Night	17	48.6	18	51.4	35	15%
Work hours per days and weeks	0-6 days	78	63.9	44	36.1	122	52%
	One week	28	54.9	23	45.1	51	22%
	2 weeks	10	37	17	63	27	12%
	3 weeks or more	18	54.5	15	45.5	33	14%
Daily long working hours	Less than 8 hours	0	0	0	0	0	0%
	8-10 hours	101	60.5	66	39.5	167	72%
	11-13 hours	15	41.7	21	58.3	36	15%
	14 or more	18	60	12	40	30	13%
Weekly long working hours	30hours	6	37.5	10	62.5	16	7%
	35 hours	39	56.5	30	43.5	69	30%
	40 hours	45	70.3	19	29.3	64	27%
	45 or more hours	44	52.4	40	47.6	84	36%

Table (5.2) displays that the nurses who have worked for the Evening / Night shift possess the highest percentage with (40.8%) followed by those who worked Day / Evening shift with (30.5%), then who worked Day / Night shifts (15.0%) and straight day have the lowest percentage (13.7%). This representation is very important as it revealed that the majority of nurses were hired for double duties.

Table (6) , reports the long working hours by nurses in days and weeks respectively. It`s clear that 0-6 days recived the highest percentage (52.4%), while one week (21.9%) and 3 weeks or more (14.2%) got the second and third rate. And working 2 weeks (11.6%) was the last.

In addition, the nurses who have worked between 8-10 hours have the highest percentage with (71.7%), followed by 11-13 hours (15.5%), then 14 or more (12.9%), while working less than 8 hours had the lowest percentage of (0%).

From the above table it can be seen that nurses who have worked for 45 hours or more last month have the highest percentage with (36.1%) followed by working for 35 hours (29.6%) then 40 hours (27.5%) while working for 30h/week represents the lowest percentage of (6.9%).

Table 5.3: Reasons for working extended shifts

Reasons for working extended shifts	N	Percent (%)
family reason	49	21.0
Compulsory	102	43.8
more income	69	29.6
voluntary	13	5.6
	233	100%

Table (5.3) indicates long working hours per reason and shows the highest percentage of nurses who work extended shifts is mainly (43.8%) for compulsory shift by hospital regulations. (29.6%) make the percentage who work to get more income and (21.0%) for family reason. The lowest percentage (5.6%) was found for those who work for voluntary reason. This means that high number of nurse's is at risk.

Table 5.4: Number of Patients assigned for each nurse

Number of Patients assigned	N	Percent (%)
0-2Patients	29	12.4
3-5Patients	111	47.6
6-8Patients	38	16.3
9 or more Patients	55	23.6
	233	100%

Regarding the number of patients assigned to care for - during your long working hours for each nurse- the highest percentage was among giving care for 3-5 patients (47.6%), followed by 9 patients or more (23.6%), while giving care for 6-8 patients has the lowest percentage of (16.3%).

Table 5.5: Nurses perception of long working hours

Long working hours	N	Percent (%)
6-8 hours	18	7.7
9-11 hours	52	22.3
12-14 hours	72	30.9
15 or more	91	39.1
	233	100%

Table (5.5) shows that nurses perception of working for 15 or more hours is considered as long working hours that could affect their vigilance have the highest percentage with (39.1%), followed by 12-14 hours with (30.9%) . (22.3%) for nurses perception rate for those who work 9-11 hours and (7.7%) for those who work 6-8 hours as the lowest rate. This results agreed with the most common definitions of extended hours are the shifts longer than 12, 16, or 24 hours.

Table 5.6: Number of incident reports during last month

Number of event reports	N	Percent (%)
0-2 reports	182	78.1
3-5 reports	43	18.5
6-8 reports	5	2.1
9 or more reports	3	1.3
	233	100%

Table (5.6) presents the number of nurses reporting incidents as a mistake happens. Nurses who reported 0-2 reports were the highest percentage with (78.1%); followed by 3-5 reports (18.5%) while 9 or more has the lowest percentage of (1.3%). This means that the majority of the nurses do their work well taking into their consideration patients` safety.

5.1.2 Second: Dependent variables

Represent the responses of nurses for all items of the questionnaire which consist the areas of the study, included the following:

#	Domain Name	# of item
1	level of vigilance during the long working hours	11
2	The patients` safety level during the long working hours	11
3	Patient Safety /Frequency of Events Reported	3
4	Duties affected by vigilance and patients` safety	7

5.2 Over all Domains

The overall domains reflect the summation of all subscale scores. Table (5.7) shows that the patient safety/ frequency of events reported is the highest among all of items with a mean of (3.77 and SD 0.435) which is highly positive, followed by the patient safety level during the long working with an average of (3.3) SD(0.723) which is medium and expresses a positive trend. While, the rest of the fields indicate an intermediate response to the questionnaire items.

Table 5.7: The averages (mean) and standard deviation of the responses of the nurses` in the four study areas

#	Domain Name	Mean	STDEV
1	level of vigilance during the long working hours	2.5	0.512
2	Patient safety level during the long working hours	3.3	0.723
3	Patient Safety /Frequency of Events Reported	3.77	0.435
4	Duties affected by vigilance and patients` safety	1.38	0.435
	All Domains	2.73	0.336

5.3 Detailed Analysis

In order to answer research questions, the four domains were presented separately according to the nurses` answers and analyzed using means, standard deviation in reference to Likert scale as shown in appendix (6B).

Answering the first research question: **What is the percentage (prevalence) of long working hours among nurses working in critical care units in target hospitals?**

This question was answered by adding the number of nurses (who work for compulsory shifts) and dividing it by the overall number of critical care nurses in both hospitals and the results were as follows: 55.2 % and 30% respectively for Palestine Medical Complex and Al-Istishari Arab hospital. The following table shows the prevalence of long working hours among nurses working in critical care units in target hospitals (See tables 5.8, 5.9)

Table 5.8 Prevalence of long working hours among nurses in Palestine Medical Complex

Department/PMC	# of nurses	# of compulsory long working hours	Prevalence of nurses at risk
ICU	17	5	55.22%
Pediatric ICU	16	4	
NICU	16	6	
OR-Kuwaiti	15	10	
OR- Ramallah sons wing	7	5	
ER	32	22	
Pediatric-ER	5	5	
CCU-Kuwaiti	16	14	
CCU-Ramallah sons	11	3	
Total	135	74	

Table 5.9 Prevalence of long working hours among nurses in Al-istishari Arab hospital

Department/ Istishari Arab hospital	# of nurses	# of compulsory long working hours	Prevalence of nurses at risk
NICU	34	19	30%
ER	14	5	
OR	10	2	
CCU	15	-	
ICU(Adult +Pediatric)	26	4	
Total	99	30	

5.3.1 Findings of the questions applied in the study

Answering the second research question: **Is there a significant relationship between long working hours and nurse's perception of patient's safety?**

Pearson correlation coefficient was performed to answer this question and the results were as follows:

Table 5.10, shows no real significance difference (.737) is greater than $\alpha \leq 0.05$. There are no statistically significant differences at $\alpha \leq (0.05)$ between the Long working hours that and patient safety and vigilance.

Table 5.10 One way ANOVA comparing long working hours and patient safety

ANOVA

Domain: Patient Safety

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.668	3	.223	.422	.737
Within Groups	120.715	229	.527		
Total	121.383	232			

Answering the third research question: **Is there a significant relationship between long working hours and nurses vigilance? (See tables 5.11, 5.12, 5.13)**

A T-test was used to find if there is a relationship between long working hours and nurses' vigilance. Mean and standard deviations were tested and the results were as follows:

Table 5.11 Mean and standard deviation for long working hours

long working hours that could affects your vigilance					
		Frequency	Percent of long working hours	Mean of long working hours	ST. Deviation
Valid	6-8 hours	18	7.7	3.01	0.96
	9-11 hours	52	22.3		
	12-14 hours	72	30.9		
	15 or more	91	39.1		
	Total	233	100.0		

The t-test was performed in two stages to compare the mean of long working hours in regard to vigilance for categories (6-8 hours and 9-11 hours). The results were as follows:

Table 5.12: Mean and standard deviation for (6-8) and (9-11) long working hours

Domain Name	hours	NO.	Mean	ST DEV	f	Sig
Level of vigilance	6-8 hours	18	2.34	0.14	0.02	0.87
	9-11hours	52	2.54	0.07		

Table (5.12) shows that significance value for the level of vigilance is greater than $\alpha \leq 0.05$. Therefore, there are no statistically significant relationship between long working hours and nurses' vigilance for both categories.

For categories (12-14 hours and 15 or more) the results are as follows:

Table 5.13: Mean and standard deviation for (12-14) and (15 or more) long working hours

Domain Name	hours	NO.	Mean	ST DEV	f	Sig
Level of vigilance	12-14 hours	72	2.46	0.41	0.69	0.03
	15 or more	19	2.49	0.54		

Table (5.13) shows that significance value for the level of vigilance is below $\alpha \leq 0.05$. Therefore, there are significant relationship between long working hours and nurses' vigilance for both categories. For more accuracy the lowest dominator calculation was performed revealed a significant difference between working for (35h - 40h) and (40- 45 h or more) ($P=0.003$) ($P=0.021$) are less than 0.05(See table 5.14).

Table 5.14: The Lowest Calculation Dominator for weekly long working hours

Multiple Comparisons

dom1
LSD

(I) Weekly Working hours	(J) Weekly Working hours	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
30 hours	35 hours	.03614	.14002	.797	-.2397-	.3120
	40 hours	-.22656-	.14104	.110	-.5045-	.0513
	45 or more	-.03244-	.13765	.814	-.3037-	.2388
35 hours	30 hours	-.03614-	.14002	.797	-.3120-	.2397
	40 hours	-.26270 [*]	.08757	.003	-.4353-	-.0902-
	45 or more	-.06858-	.08199	.404	-.2301-	.0930
40 hours	30 hours	.22656	.14104	.110	-.0513-	.5045
	35 hours	.26270 [*]	.08757	.003	.0902	.4353
	45 or more	.19412 [*]	.08373	.021	.0291	.3591
45 or more	30 hours	.03244	.13765	.814	-.2388-	.3037
	35 hours	.06858	.08199	.404	-.0930-	.2301
	40 hours	-.19412 [*]	.08373	.021	-.3591-	-.0291-

*. The mean difference is significant at the 0.05 level.

Answering the fourth research question: **Is there a relationship between the difficulties faced by the nurse to stay awake and patients` safety?**

To answer this question, the mean and standard deviation for each question were find as well as the relationship between each question and patient safety, by using the Pearson correlation coefficient. The results are as follows (See table 5.15).

Table (19): Mean, Standard deviation and P value for level of vigilance

Q#	Question	Mean	STDEV	P Value	Is there a relation with safety	R - value
1	I take stimulant drinks such as coffee to stay awake during the extended shift	3.08	1.433	0.000	yes	0.2
2	I fall asleep During the extended shift	2.23	1.048	0.000	yes	0.4
3	I stay awake easily during the extended shift	3.37	1.107	0.870	no	
4	I take a nap to stay awake During the extended shift	2.23	1.129	0.000	yes	0.4

5	during the extend shift, I take stimulant medication	1.24	.695	0.350	no	
6	I need medication To fall asleep at day off	1.43	.940	0.350	no	
7	I wake up easily during at the day off	3.1	1.070	0.770	no	
8	during extended shift I struggle to stay awake	3.01	1.198	0.000	yes	0.4
9	Countermeasures, e.g., naps during break periods & use of caffeine, increase my alertness during working 12-hour shifts	2.92	1.272	0.000	yes	0.4
10	I feel sleepy (less vigilant) by the time I start the extended shift	2.22	1.008	0.670	no	
11	I am more likely to feel sleepiness, and reduced performance during an extended shift	2.91	1.097	0.000	yes	0.6

The results of table (15.5) shows that the significance value of the questions (1, 2, 4, 8, 9, and 11) (0.000), is less than $\alpha \leq (0.05)$, this shows that there is a statistically significant relation between these items and patient safety. These results point out those strategic measures that takes to deal with nurses' difficulties to stay awake is related to patient safety.

Answering the fifth research question: **are there differences on the levels of nurses' vigilance at Palestine Medical Complex and al-Istishari Arab Hospital?**

To answer this question, the averages and Standard deviations were performed for the two hospitals and the results are as follows. (See table 15.7).

Table 15.7: Comparing level of vigilance between the targeted hospitals

Q		Palestine Medical complex		Istishari Hospital		T-test	
		Mean	SD	Mean	SD	Sig	Is there difference
q1	I take stimulant drinks such as coffee to stay awake during the extended shift	3.28	1.5	2.8	1.3	0.00	yes
q2	I fall asleep During the extended shift	2.33	1.11	2.09	0.94	0.01	yes
q3	I stay awake easily during the extended shift	3.57	1.11	3.11	1.1	0.32	no
q4	I take a nap to stay awake During the extended shift	2.33	1.2	2.33	1.1	0.28	no
q5	during the extend shift, I take stimulant medication	1.5	0.8	1.08	0.4	0.00	yes
q6	I need medication To fall asleep at day off	1.6	1.1	1.19	0.63	0.00	yes
q7	I wake up easily during at the day off	3.24	1.08	2.92	1.08	0.24	no
q8	during extended shift I struggle to stay awake	3.08	1.3	2.92	1.22	0.11	no
q9	Countermeasures, e.g., naps during break periods & use of caffeine, increase my alertness during working 12-hour shifts	2.9	1.33	2.94	1.2	0.16	no
q10	I feel sleepy (less vigilant) by the time I start the extended shift	2.55	0.98	1.77	0.85	0.23	no
q11	I am more likely to feel sleepiness, and reduced performance during an extended shift	3.05	1.2	2.72	0.95	0.25	no
Total mean		2.68		2.35			

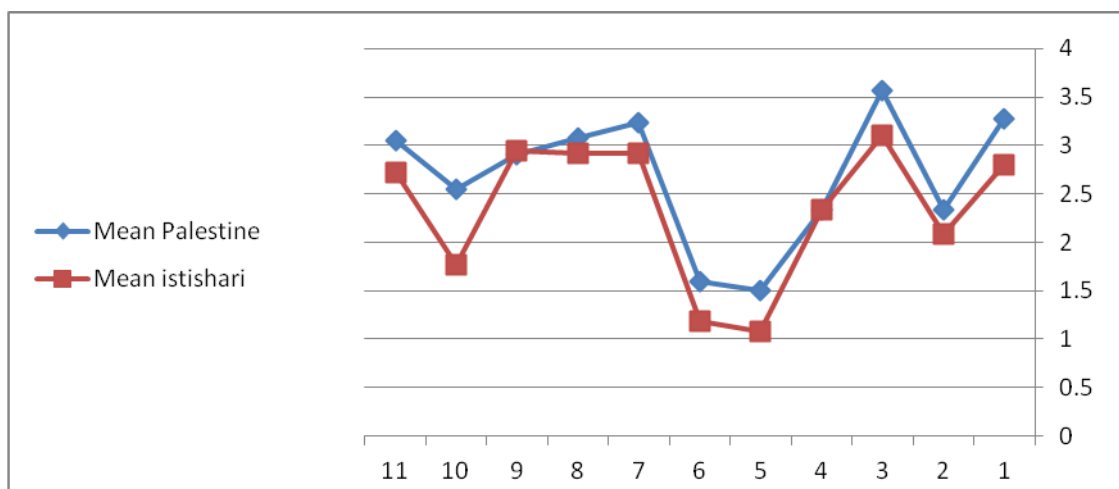


Figure 5.1: Level of vigilance among nurses in the targeted hospitals

Figure 5.2, clarifies the significance difference that was found between the targeted hospitals regarding to the nurses level of vigilance. The conclusion is that the differences between the mean for Palestine Medical Complex and for al-Istishari Arab hospital is not the same; the mean for Palestine Medical was higher. Therefore, significance difference is less than $\leq (0.05)$ were found in the following questions (I take stimulant drinks such as coffee to stay awake during the extended shift, I fall asleep during the extended shift, during the extend shift, I take stimulant medication and I need medication to fall asleep at day off).

5.4 Nurses` demographic characteristics with regard to vigilance and patient safety

To answer research question six: **Explore possible association between background variables and nurses` vigilance and nurse`s perception of patient safety**

Demographic variables (gender, age, educational level, current position, experience, department and place of work) and work pattern variables (shift type, working Duration / by days and weeks Daily long working hours, Weekly long Working Hours, Number Of Patients Assigned, Reasons For Working Extended Shifts), were analyzed with respect to their potential relationship with nurses vigilance and patients safety. Mean, standard deviation and significance level were recorded for each variable. (See tables 5.18, 5.19)

An independent t- test was used to see if there is a relationship between nurses` vigilance and gender. (See table 5.18).

Table 5.18: An independent t- test comparing vigilance with regard to Gender

Domain Name	Gender	NO.	Mean	ST DEV	T	Sig
level of vigilance	Male	152	2.56	0.48	3.38	0.45
	Female	81	2.33	0.53		

Table (5.18), showed that males and females nurses` had closely similar means score and no statistical significance relationship were recorded between the two groups and nurses` vigilance because the significance value (0.450) is greater than $\alpha \leq 0.05$.

Table 5.19: Nurses` demographic characteristics with regard to vigilance and patient Safety

Variable	variance	Sum of Squares	df	Mean Square	F	Sig
Age	Between Groups	.385	3	.128	.486	0.692
	Within Groups	60.459	299	.264		
	Total	60.844	232			
Level of nursing education	Between Groups	2.579	4	.645	2.523	.042
	Within Groups	58.265	228	.256		
	Total	60.844	232			
Experience	Between Groups	1.287	3	.429	1.650	.179
	Within Groups	59.557	229	.260		
	Total	60.844	232			
Current position	Between Groups	2.188	3	.729	2.848	.038
	Within Groups	58.656	229	.256		
	Total	60.844	232			
Department	Between Groups	4.028	5	.806	3.219	.008
	Within Groups	56.816	227	.250		
	Total	60.844	232			

One way ANOVA was used to investigate the association between nurses` age (different age groups) and vigilance. The different age groups including (22-31), (32-41), (42-51) and (52 or more) revealed no real differences and no statistical significant relationship with vigilance because the significance value (0.692) is greater than $\alpha \leq 0.05$

The table presents one way ANOVA results comparing nurses' vigilance with level of nursing education. That table shows real difference and statistical significant relationship when analyzed with level of nurses vigilance because ($p=.042$) is less than $\alpha \leq 0.05$.

With regard to the years of experience, one way ANOVA was used to investigate the association between years of experience and vigilance. Nurses answers revealed no real differences and no statically significance relationship were found ($P= .179$) is greater than $\alpha \leq 0.05$.

Current position of the participant nurses showed real difference (0.38) is less than $\alpha \leq 0.05$ that indicates statistical significance relationship with vigilance. The below table shows the mean of vigilance for each position.

Position	N	Mean of vigilance	SD of vigilance
Practical nurse	59	2.4610	.52654
Registered nurse	153	2.5294	.50600
Total	233	2.4820	.51211

On the other hand, the different working departments revealed real difference (0.08) is less than $\alpha \leq 0.05$ which indicates statistical significance relationship with vigilance. Accordance to Lowest common denominator calculation, the differences (.003) tend to Neonatal ICU and Adult ICU departments also between operating room and Neonatal ICU (.656) (Table 5.20).

Table 5.20: LCD Calculation between working departments

(I) Department Type	(J) Department Type	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Adult ICU	Neonate ICU	.30871*	.10442	.003	.1030	.5145
	Pediatric ICU	.14205	.14605	.332	-.1457-	.4298
	Emergency	.10732	.13998	.444	-.1685-	.3831
	Operating Room	-.04353-	.09767	.656	-.2360-	.1489
	CCU	.15574	.10792	.150	-.0569-	.3684
(I) Department Type	(J) Department Type	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Operating Room	Adult ICU	.04353	.09767	.656	-.1489-	.2360
	Neonate ICU	.35224*	.09521	.000	.1646	.5399
	Pediatric ICU	.18558	.13962	.185	-.0895-	.4607
	Emergency	.15085	.13325	.259	-.1117-	.4134
	CCU	.19927*	.09905	.045	.0041	.3944

Regarding to place of work. Mean, standard deviation was recorded and the result was as follow (See table 5.21).

Table 5.21 Mean and standard deviation of vigilance for each hospital

Hospital Name & Type					
Domain	Hospital Name & Type	frequency	Percent	Mean of vigilance	SD of vigilance
level of vigilance	Palestine Medical complex (Governmental sector)	134	57.5	1.42	0.5
	Istishari (Private sector)	99	42.5		
	Total	233	100.0		

Also, Chi-square test was used to investigate the association between place of work and vigilance .Nurses` showed real difference and statistical significant relationship when analyzed with level of nurses vigilance because ($p=.000$) is less than $\alpha \leq 0.05$.(See Table 5.22)

Table 5.22: Chi-square test comparing nurses` vigilance regarding place of work

Chi-Square Tests			
	Value	df	Sig.
Pearson Chi-Square	42.673 ^a	29	.049
Likelihood Ratio	50.511	29	.008
Linear-by-Linear Association	26.031	1	.000
N of Valid Cases	233		

5.5 Work environment variables with regard to vigilance and patient safety

Work environment variables (shift type, working Duration / by days and Week, Daily long working hours, Weekly long Working Hours, Number Of Patients Assigned, Reasons For Working Extended Shifts),were analyzed with respect to their potential relationship with nurses vigilance and patients safety. Table (5.23) represents one way ANOVA comparing vigilance with work environment variables.

Table 5.23: one way ANOVA comparing vigilance with work environment variables

		Sum of	df	Mean	F	Sig
Variable	variance	Squares		Square		
Shift	Between Groups	.524	3	.175	.664	.575
	Within Groups	60.320	299	.263		
	Total	60.844	232			
Long working hours per day and weeks	Between Groups	1.703	3	.568	2.198	.089
	Within Groups	59.141	299	.258		
	Total	60.844	232			
Daily long working hours	Between Groups	.834	3	.417	1.598	.205
	Within Groups	60.010	230	.261		
	Total	60.844	232			
Weekly long working hours	Between Groups	2.532	3	.844	3.315	.021
	Within Groups	58.312	229	.255		
	Total	60.844	232			
Number of patients assigned to care for	Between Groups	3.152	3	1.051	4.170	.007
	Within Groups	57.693	229	.252		
	Total	60.844	232			

The table 5.23, shows one way ANOVA comparing vigilance with shift type; the results reveal that there are no significant difference between vigilance and shift type ($p=.575$) is greater than $\alpha < 0.05$. No Statistical significant relationship was recorded.

With regard to the duration of long working hours in days and weeks showed no real difference (0.89) is greater than $\alpha < 0.05$ when analyzed with vigilance , reported that no statistical significance were between vigilance and duration of long working hours per day/week.

The table, shows that daily long working hours indicates no real difference when analyzed with vigilance, reported that no statistical significance were between vigilance and daily long working hours. ($p = .205$) is greater than $\alpha \leq 0.05$

Also, weekly long working hours were tested by using one way ANOVA and the results showed real significance difference when analyzed with respect to vigilance. A statistical significance relationship was recorded between vigilance and weekly long working hours. (.021) is less than $\alpha \leq 0.05$.

Table 5.23, clarifies the significant difference that was found between the number of patients assign to care for each nurse and vigilance. Concluded that there is a statistical significance relationship between number of patients and vigilance. (.007) is less than $\alpha \leq 0.05$

Table 5.24, shows Pearson correlation coefficient results comparing reasons to work extended shifts and vigilance. Shows no real difference, therefore no statistical significance relationship between reason to work extended shifts and vigilance were recorded. (0.33) is greater than $\alpha \leq 0.05$

Table 5.24: Pearson correlation coefficient results for the significance relationship between long working hours and reasons for working extended shifts

Descriptive Statistics				
	Mean	Std. Deviation	N	Sig
long working hours that could affects your vigilance	3.01	.963	233	0.33
Reasons for working extended shifts	2.20	.833	233	

With regard to the tasks that could affect nurses' vigilance during the long working hours. Table 5.25, represents regression coefficient comparing the tasks with regard to nurses' vigilance. Highly significant difference was recorded. This finding indicates a statistical significance relationship between vigilance and task that could affect nurses' vigilance during the long working hours. (.033) is less than $\alpha \leq 0.05$.

Table 5.25: Regression coefficient comparing vigilance with regard to tasks that could affect nurses' vigilance during the long working hours

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.857	1	.857	4.593	.033 ^b
	Residual	43.107	231	.187		
	Total	43.964	232			

a. Dependent Variable: dom4

b. Predictors: (Constant), dom1

5.6 level of nurses' vigilance during the long working hours

Nursing, more than any other health care profession, claims caring as fundamental to its practice. Professional vigilance is the essence of caring in nursing. Therefore, as a starting point to explore the level of nurses vigilance during the long working hours , the participants were asked a series of questions illustrated in table (5.26) regarding who remains ready to act , who takes stimulate drinks or medicines to stay awake ...etc. Thus, frequencies, percentages, P value and the level of significance were recorded and the results were mentioned in the below table (see 5.26 table).

Table 5.26: Frequencies, Percentages, P value and the level of significance of the field

Item		Always	Most Of the time	Sometimes	Rarely	Never	Mean	%	P-value
I take stimulant drinks such as coffee to stay awake during the extended shift	#	54	41	52	41	45	3.08	62%	.412
	%	23.2	17.6	22.3	17.6	19.3			
I fall asleep During the extended shift	#	8	18	58	84	65	2.23	45%	.000
	%	3.4	7.7	24.9	36.1	27.9			
I stay awake easily during the extended shift	#	36	77	75	28	17	3.37	67%	.000
	%	15.5	33.0	32.2	12.0	7.3			
I take a nap to stay awake During the extended shift	#	7	27	58	62	79	2.23	45%	.000
	%	3.0	11.6	24.9	26.6	33.9			
during the extend shift, I take stimulant medication	#	2	4	11	13	203	1.24	25%	.000
	%	0.9	1.7	4.7	5.6	87.1			
I need medication To fall asleep at day off	#	5	8	20	16	184	1.43	29%	.000
	%	2.1	3.4	8.6	6.9	79.0			
I wake up easily during at the day off	#	26	50	97	42	18	3.10	62%	.143
	%	11.2	21.5	41.6	18.0	7.7			
during extended shift I struggle to stay awake	#	27	57	71	48	30	3.01	60%	.870
	%	11.5	24.5	30.5	20.6	12.9			
Countermeasures, e.g., naps during break periods & use of caffeine, increase my alertness during working 12-hour shifts	#	33	40	75	45	40	2.92	58%	.329
	%	14.2	17.2	32.2	19.3	17.2			
I feel sleepy (less vigilant) by the time i start the extended shift	#	5	18	65	80	65	2.22	44%	.000
	%	2.1	7.7	27.9	34.3	27.9			
Iam more likely to feel sleepiness, and reduced performance during an extended shift	#	24	37	87	64	21	2.91	58%	.211
	%	10.3	15.9	37.3	27.5	9.0			
Main Of All Domain							2.5	50%	

Table 5.25, clarifies a moderate response of nurses' regarding the level of vigilance during the long working hours with mean of (2.5) indicates the following results:

- (40.8%) of the participant nurses` are taking stimulant drinks to stay awake during long working hours while (36.9%) are not . No statistical significance was found here ; ($P=0.421$) is greater than $\alpha=0.05$.The researcher refers to these results as a proof that nurses are not convinced that there is any importance that drinking stimulants drinks increase the level of vigilance.
- Almost (11.1%) of participant nurses fell asleep at least once during long working hours while (64%) either did not or rarely did. Statistical significance was proven here ; ($P=.000$) is less than $\alpha \leq 0.05$. This result highlights that nurses do not fell asleep during long working hours, and the researcher attributes this result as a proof that nurses are convinced that long working hours not affecting them and doing their duty well.
- (48.8%) of participant nurses are staying awake most of the time during the long working hours while (19.3%) rarely or never. Statistical significance was found here; ($P=.000$) is less than $\alpha \leq 0.05$. The researcher attributes this result as a proof that it is normal to feel sleepy due to long working hour. This varies from person to person and according to the characteristics of nurses, which vary from nurse to nurse.
- (14.6%) of the participant nurses` reported that naps taken during the shift may have actually improved alertness during the long working hours ,while 60.5% didn't. Statistical significance was reported here ($P=.000$) is less than $\alpha \leq 0.05$. Thereby, the researcher attributes to these results as a proof that nurses are convinced that taking a brief nap affects the patient safety.
- (95.7%) of the participant nurses do not taking stimulate medicines to stay awake during the extended shift while (2.6%) does so. A statistical significance was reported here; ($P=0.00$) is less than $\alpha \leq 0.05$, this result confirms the agreement of the nurses that there is no need to take stimulate medicines to keep them awake, and the researcher attributes to these facts as a proof that they are professional workers and knows the harmful effects of medicines or their assurance of uselessness or need.
- (5.5%) of the participant nurses reported that they need medication to sleep in the holiday while (85.9%) do not. A statistical significance difference was found here; ($P=0.000$) is less than $\alpha \leq 0.05$.Points out that the nurses are not suffering to sleep and long hours do not affects their sleep.

- Almost one third of the participant nurses` (33.7%) are woke up easily during the holiday while 25.7% do not. This shows no real statistical significance difference; ($P=0.143$) is greater than $\alpha \leq (0.05)$ and nurses opinions are neutral. The researcher attributes this result as a proof to nurses different abilities endures.
- Almost one third of the nurse participants reported struggling to stay awake at least once during day data-gathering period (36%) while (33.5%) did not. Otherwise, there is no real statistical significance difference here; ($p \text{ value} = 0.870$) is greater than $\alpha \leq (0.05)$ therefore, nurses answers were neutral. The researcher attributes this result as a proof that nurses are vigilant and are not suffering from long working hours.
- (31.4%) of the participant nurses agreed that countermeasures the (anti-vigilance measures) increases their vigilance during work over the 12 hours while (20.12%) didn't. No statistical significance difference was reported here; ($P= 0.329$) is greater than $\alpha \leq (0.05)$ and nurses` answers were neutral.
- (9.8%) of the participant nurses feel sleepy by the time they start long hours while (62.2%) did not .This shows real statistical significance difference; ($P= (0.00)$) is less than $\alpha \leq (0.05)$, this proves that nurses do not feel sleepy by the time they start working long hours.
- (26.2%) of the participant nurses are feel sleepy -which reduces their vigilance - during long hours while (36.5%) do not. This shows no real statistical significant difference ($P= 0.211$) is greater than $\alpha \leq (0.05)$ thus, the nurses` answers here were neutral.

5.7 patient safety level during long working hours through participant nurses

This section outlines the results from data collected for the eleven questions about the nurses' perception to patient safety. Attention is given to the way in which participants answered about patients' safety as important concept. The below table illustrates the participant answers, frequencies, P values and the level of significance (See table 5.26).

Table 5.26: Frequencies, Percentages, P values and the level of significance of the field

Item		Always	Most of the time	Sometimes	Rarely	Never	Mean	%	P-value
I made a medication administration error during the extended shift	#	0	3	17	50	163	1.40	28%	.000
	%	0.0	1.3	7.3	21.5	70.0			
I find mistakes in nursing written or verbal hand-over that I received after 7 p.m. during the extended shift	#	6	11	61	67	88	2.06	41%	.000
	%	2.6	4.7	26.2	28.8	37.8			
I believe that patient safety could be improved with clear reports received from the previous shift nurse	#	104	62	35	17	15	3.96	79%	.000
	%	44.6	26.6	15.0	7.3	6.4			
I always wear a face mask if I have flu to protect patient safety	#	84	50	63	21	15	3.68	74%	.000
	%	36.1	20.2	24.0	15.0	4.7			
To prevent patient falling if they need transition to bathroom, x-ray...etc , I always ask for help during the extended shift	#	84	50	63	21	15	3.72	74%	.000
	%	36.1	21.5	27.0	9.0	6.4			
During patients transition I usually check the bed rails if they're locked to prevent patient fall	#	155	40	25	9	4	4.43	89%	.000
	%	66.5	17.2	10.7	3.9	1.7			
I usually change patients' position every two hours (<i>to prevent bed sore for bedridden patient</i>)	#	130	74	17	6	6	4.36	87%	.000
	%	55.8	31.8	7.3	2.6	2.6			
Improper hand washing always spread nosocomial infection among patients	#	164	43	17	5	4	4.54	91%	.000
	%	70.4	18.5	7.3	2.1	1.7			
I wash my hands before and after giving care to each patient	#	119	39	51	19	5	4.06	81%	.000
	%	51.1	16.7	21.9	8.2	2.1			
Important patients' information often lost during shift change	#	10	15	50	87	71	2.17	43%	.000
	%	4.3	6.4	21.5	37.3	30.5			
Shift change during the transition period often jeopardize patients' safety in this hospital	#	9	11	41	77	95	1.98	40%	.000
	%	3.9	4.7	17.6	33.0	40.8			
Main Of All Domain							3.30	66%	

It can be noticed from table 5.26 that the overall mean of domain was 3.3 which indicates a moderate response by the participant nurses and points out the following results:

- Only (1.3%) of the participants made at least one medication administration during the long working, while (91.5%) did not. This shows a real statistical significance; ($P=0.00$) is less than $\alpha \leq (0.05)$. This result proves that they are professional workers and aware enough not to make any mistakes during long working hours.
- (7.3%) of the participants reported that they find mistakes in nursing hand-over written or verbal while (66.6%) didn't. A statistical significance was founded here; ($P=0.00$) is less than $\alpha \leq 0.05$. The researcher attributes this result as a proof that nurses are doing their work with high efficiency, accurate way and are convinced that making any mistakes can affect patients' safety.
- (71.2%) of the participants agree that patients' safety can be improved with clear reports received from the previous shift nurse while (13.7%) disagree. This shows a real statistical significance; ($P=0.00$) is less than $\alpha \leq 0.05$. The researcher refers these results as a proof that the clarity of the reports prepared by previous shift nurse can improve patients' safety. Thereby, it leads to avoiding errors in period of rotation.
- (56.3%) of the participant nurses wear face mask if they have flu to protect patients' safety while (23.7%) do not. Statistical significance was found here; ($P=0.00$) is less than $\alpha \leq 0.05$. The researcher attributes this result as a proof that nurses have weak/shallow basic knowledge about the importance of wearing face mask.
- (57.6%) of the participant nurses are ask for help during the extended shift to prevent patients falling while (15.4%) do not. Statistical significance was reported here; ($P=0.00$) is less than $\alpha \leq 0.05$, indicates that a low percentage of nurses asking for help. The researcher refers this result as a proof that part of the nurses are embarrassed to ask for help or believe that it is unimportant and depends on themselves.
- (83.7%) of the participant nurses check if the bed rails are locked while transferring patients while (5.6%) do not. This shows a statistical significance was proved here; ($P=0.00$) is less than $\alpha \leq 0.05$. The researcher refers this result as a proof that nurses concern about patients' safety during his hospitality.
- (87.6%) of the participant nurses change the patients position every two hours (*to prevent bed sore for bedridden patient*) while (5.2%) do not. This shows statistical significance; ($P=0.000$) is less than $\alpha \leq 0.05$. The researcher refers this result as a proof of the nurses attention to patient's condition.

- (88.9%) of the participant nurses agree that improper hand washing always spread nosocomial infection among patients while (3.8%) do not. This shows a statistical significance was proved here; ($P=.000$) is less than $\alpha \leq (0.05)$. The researcher refers these results as a proof that the majority of nurses are convinced that improper hand washing leads to nosocomial infection.
- (67.8%) of the participants reported that they wash their hands before and after giving care to each patient while (10.3%) do not. Statistical significance was reported here; ($P =.000$) is less than $\alpha < = (0.05)$. The researcher attributes this result as a proof that the majority of nurses are convinced of the importance of washing their hands to prevent diseases.
- (10.7%) of the participant nurses check the important information of patients care during the shift change while (67.8%) do not. this shows a Statistical significance here; ($P= .000$) is less than $\alpha \leq (0.05)$. This result reveals that nurses do not check the important information regarding patients care during the shift changes due to their negligence or lack of conviction about the importance to check.
- (8.6%) of the participants agree that shift change during the transition period often jeopardize patients' safety while (73.88%) do not. A statistical significance was reported; $P= (.000)$ is less than $\leq (0.05)$. The researcher refers this result as a proof that nurses agree that there is no risk during the transition from one shift to another among patients safety.

5.8 Patient Safety /Frequency of Events Reported level

While the idea of incident reporting is stated to be the top priority for many health care organizations, as a requirement for patients' safety, participants were asked a series of questions that touched the ability of nurses to report.

In order to measure levels of incident reporting , frequencies, percentage , p values and the significance level were performed and the results were summarized in the below table

(See table 5.27).

Table 5.27: Frequencies, Percentages, P value and the significance level of the field

Item		Always	Most of the time	Sometimes	Rarely	Never	Mean	%	P-value
When a mistake is made but is caught and corrected before affecting the patient, How often is this reported?	#	74	61	52	29	17	3.63	73%	.000
	%	31.8	26.2	22.3	12.4	7.3			
When a mistake is made, but has no potential to harm the patient, how often is this reported?	#	73	59	65	25	11	3.68	74%	.000
	%	31.3	25.3	27.9	10.7	4.7			
When a mistake is made that could harm the patient, but does not life threatening, how often is this reported?	#	97	66	49	16	5	4.00	80%	.000
	%	41.6	28.3	21.0	6.9	2.1			
All The Dome							3.77	75%	

It can be noticed from table 5.27 that the overall mean and percentage of domain were 3.77 and 75% respectively indicates a high response by the participant nurses and points out the following results:

- (58%) of the participant nurses reported that they catch themselves before making an error (while 19.7%) do not. A statistical significance different was reported here; ($P=.000$) is less than $\alpha \leq (0.05)$. The researcher attributes this result as a proof that nurses are highly professional and adhering to patients' safety instructions.
- (57.6%) of the participants report incidents when a mistake is made, but has no potential to harm the patient while (15.4%) do not. This shows a statistical significance; ($P=.000$) is less than $\alpha \leq (0.05)$. The researcher refers to this result as a proof that the nurses are willing to report mistakes in order to protect patients' safety.
- (69.9%) of the participants report serious harm error happened to patient, but is not life threatening while (9%) do not. Real statistical significance were reported here; ($P=.000$) is less than $\alpha \leq (0.05)$. The researcher refers this result as a proof that a good percentage of nurses are willing to report when serious harm error has happened but is not life threatening, thereby protecting patient safety.

5.9 Tasks affected by vigilance

In the last section of the questionnaire , participants nurses were shown a seven tasks and asked to comment on how each task could be affected by vigilance or not. The second column in the table identifies the ways participant's answered how each specific tasks was affected by vigilance or not. The third column shows the statistical analysis by addressing mean of vigilance, p value and level of significance for each task (see table 5.28).

Table (5.28): Frequency, Percentages, P value, and Significance Level of the Field

Item					Mean	P-value
		Yes	Don't know	No		
Medications administration	#	165	57	11	1.34	.000
	%	70.8	4.7	24.5		
Monitor patients' vital signs	#	150	75	8	1.39	.000
	%	64.4	3.4	32.2		
Prepare patients for surgery	#	142	73	18	1.47	.000
	%	60.9	7.7	31.3		
Communication with Medical team about patients condition	#	165	61	7	1.32	.000
	%	70.8	3.0	26.2		
Educating patients on disease prevention	#	162	60	11	1.35	.000
	%	69.5	4.7	25.8		
Evaluating and monitoring devises	#	150	68	15	1.42	.000
	%	64.4	6.4	29.2		
Complete all physician orders ,conduct treatments and tests for patients	#	162	63	8	1.34	.000
	%	69.5	3.4	27.0		
The Mean Of All Domain					1.38	

It can be seen from table 5.28 that the overall mean of domain was moderate (1.38) which indicates a moderate response by the participant nurses and points out the following results:

- (70.8%) of the participants answered yes to the “Medication Administration” while (24.5%) answered no. This shows Statistical significance; (P=.000) is less than $\alpha \leq (0.05)$. The researcher refers this result as a proof that the level of vigilance affected the management of patients' medications.
- (64.4%) of the participants answered yes to “Monitor patients vital signs” while (32.2%) answered no. This shows a statistical significance ;(P=.000) is less than $\alpha \leq (0.05)$. Points out that nurses are convinced that their level of vigilance affected monitoring vital signs of patients.

- (60.9%) of the participant nurses answered yes to "Preparing Patients for Surgery," while (31.3%) answered with no. A statistical significance was reported here; ($P=.000$) is less than $\alpha \leq (0.05)$. The researcher attributes this result as a proof that nurses are convinced that their level of vigilance affected preparing patients for surgical operations.
- (70.8%) of the participant nurses answered yes to the "Communication with Medical Team about Patients Condition" while (26.2%) answered No. This shows a real statistical significance; ($P=.000$) is less than $\alpha \leq (0.05)$. The researcher attributes this result as a proof that nurses are convinced that their level of vigilance affected communicating with the medical team about the patients' condition.
- (69.5%) of the participant nurses answered yes to the "Educating Patients on Disease Prevention" while (25.8%) answered no. Statistical significance was proven; ($P=.000$) is less than $\alpha \leq (0.05)$. This result reveals that nurses agree that their level of vigilance affected educating patients about disease prevention.
- (64.4%) answered yes to the "Evaluating and Monitoring Devices" while (29.2%) answered no. Statistical significance was found; ($P=.000$) is less than $\alpha \leq (0.05)$. Therefore, nurses are convinced that their level of vigilance affected evaluating and monitoring devices.
- (69.5%) of the participant nurses answered yes to "Complete All Physician Orders, Conduct Treatments and Tests for Patients" while (27.0%) answered no. This shows statistical significance; ($P=.000$) is less than $\alpha \leq (0.05)$. The researcher attributes this result as a proof that nurses are convinced that their level of vigilance affected the completing all physician orders, conducting treatments and tests for patients.

5.6 Summary

This study examined the impact of long working hours on critical care nurses' vigilance and patient safety. The sample of 233 nurses were described from many different aspects inclusive of gender, age, level of education, experience, current position and place of work. For each question, one way ANOVA was used to compare the mean, percentages and significance value between nurses in the targeted hospitals. The use of a one way ANOVA for these variables did not show significant differences with vigilance and patient safety. The researcher found that there is statically significant relationship between long working hours and nurses' vigilance, also statically significance difference between nurses' level of vigilance in the two hospitals.

Chapter Six

Discussion and recommendations

6.1 Introduction

In this chapter the researcher will discuss the main findings and results as the research main aim is to assess the effects of long working hours on nurses' vigilance and patients' safety and compare both groups of nurses in private and governmental hospitals. The study findings might help consequently improving the quality indicators to patients' safety to complete the quality improvement process.

This study used a developed questionnaire on 233 nurses who work in both hospitals during January- February of 2018. The response rate was very high as 77% and 80% in Al-Istishari Arab Hospital and Palestine Medical Complex nurses responded respectively. Palestine Medical Complex nurses represented 58% of the selected sample for the study and Al- Istishari Arab Hospital nurses represented 42 %. Male nurses` were highly distributed in both hospitals.

Over all domains levels was reported as intermediate as 55%. The highly positive score was represented with a mean of 3.77 and SD 0.435 for patient safety/ frequency of events reported. The moderate score was the patients` safety level during the long working with an average of (3.3) SD (0.723). Therefore, it's important to enhance the nurses` practice toward the patient's safety during the long working hours; more attention and care from the nurses` must be provided to the patients. Moreover, reinforcement of the roles of the nurses in dealing with patients during the long working hours is an important area in

improving the quality of the services. When patients are dealt with professionally and tenderly by qualified and trained nurses, patients' satisfaction will consequently increase. The lowest domain degree was reported toward level of vigilance during the long working hours with mean of 2.5 and SD0.512. This could be mainly attributed to the fact that there is a need to comprehensive understanding of the sleep patterns. Quality of nurses with different work shifts lead to better management of work shifts that reduces the influence of shift work on sleep quality.

Secondly, it could be attributed to most of the critical care nurses with shift schedules display more fatigue and poor vigilance compared to those working with rotating shift schedules. Therefore, improving the quality of shift rotation encourage the nurses to continue their work with high alert, efficient performance and avoid turn over.

Another area that leads to nurses poor vigilance and performance is fixed extended or double shift and lack of staff .The high prevalence of nurses at risk in Palestine Medical Complex and Al –Istishari Arab hospitals is 55.2% and 30%. This can make an important early sign of underlying physical or mental health issues. The prevalence of nurses at risk in Palestine Medical Complex is nearly similar to several studies have investigated the prevalence of 12-hour shifts. Kalisch and Lee (2014) examined the relationship between US hospital staff, units, and team work and staff characteristics; most nurses (n=2230, 59.2%) worked more than a 12-hour, while, In opposition on to another study conducted to examine the nature and prevalence of shift patterns across Europe (Kalisch and Lee, 2013). As part of the RN4 Cast study, (Griffiths, 2014) undertook a European cross-sectional survey of nurses working in acute general medical and surgical wards. A few (n=4314, 14%) worked 12 or 13-hour shifts. According to the prevalence of long working hours at al-Istishari Arab hospital, our findings is to – some extent- similar to the finding of other study exploring how long and how much nurses are working, Trinkoff (2011) examined the nature and prevalence of shift patterns across settings. Questionnaire data about work schedule variations in the preceding months, hours worked per day, per week, weekend and on-call were analyzed. Twenty eight percent of nurses typically worked >12 hours per day (I bid).

From these results we can notice considerable variation across the prevalence of working more than 12 hours among nurses. Providing screening and monitoring programs to detect the underlying health conditions and their consequent treatment can promote health and productivity of employees and improve society's health, both directly and indirectly.

The study results showed no statistically significant relationship between long working hours and patient safety. This result is in contrast to a study clarified the impact of long nurse working hours on patient safety in Japan, USA, china and Taiwan(Yinghui ,2013). Yinghui (2013) concluded that Patient safety grade deteriorated and the number of events reported increased with long working hours. Griffiths (2014) describe shift patterns of European nurses and investigate whether shift length and working beyond contracted hours (overtime) is associated with nurse-reported care quality, safety and care left undone. The study concluded that European registered nurses working shifts of ≥ 12 hours and those working overtime report lower quality and increasing making errors and near miss errors (I bid). Finally, this result is also in contrast with Scott (2008) study determines if an association exists between the occurrence of errors and the hours worked by the nurses. Scott cited that the risk for making an error almost doubled when nurses worked 12.5 or more consecutive hours (Scott, 2008).

Whilst, this study showed that extended work shifts are associated with significantly decreased levels of alertness (vigilance). There is statistical significance difference between long working hours and the level of vigilance from 12 to 14 hours and 15 hours or more. This result is agreed with the results of the study conducted by Scott (2008) who concluded that working longer than scheduled and for extended periods decreased nurses' vigilance (Ibid). The findings support the Institute of Medicine recommendations to minimize the use of 12-hour shifts and to limit nurses' work hours to no more than 12 consecutive hours during a 24-hour period. (*American Journal of Critical Care. 2008; 15:30-37*).

Whilst, we did not find an association between decreased vigilance (i.e., struggling to stay awake or falling asleep) and increased risk of errors. Several reasons could account for the lack of a relationship between decreased alertness and an increased risk of errors. First, the number of episodes might have been too small to test the association. This explanation seems unlikely because nurses reported had difficulties to stay awake during shifts and

nurses fell asleep during additional shifts. Nurses` who reported struggling to stay awake might have actually fallen asleep, thereby improving their level of alertness for the duration of the shift. Even if the nurses did not fall asleep, their drowsiness may not have interfered with the accuracy of their performance. Our study showed that nurses don`t have any problems to stay awake for long working hours or extend shifts, a low percent of them feel sleepy and reduce their vigilance in term that they are convinced that anything they take to increase their vigilance is ineffective. Our study was in line with a study published by Scott (2008) no association between difficulties to stay awake and increased risk of errors was found (I bid).

Moreover, our study showed no significant association impacts on some of demographic variables such as (gender, age, years of experience, shift type, working duration in days and weeks and daily long working hours) on nurses` vigilance and patient safety. This is in agreement with a study conducted to determine the influence of sleep deprivation on the occurrence of errors by registered nurses working in night shift in intensive care departments. Ramadan (2014) concluded that none of the demographic variables was statistically significant, not providing evidence that these variables may explain possibility for being sleep deprived in the nursing population(I bid). This is contrasted to a study conducted by Boughattas (2014) detect the harmful effects of night shift on sleep, vigilance and the quality of life of nurses. Finds out that sleep, vigilance and quality of life were significantly correlated to age, department, schedule and the choice of schedule (I bid). Also, in contrast to other study evaluates the prevalence of low sleep quality and vigilance in health care workers with no health issues or complaints of sleep problems. (Ghalichi, 2013). Ghalichi (2013) revealed that there was a significant association between poor sleep quality and female sex, shift-working and age.

Therefore, we find statistically significant differences between the level of vigilance with the following variables (hospital type, level of nursing education, current position, worked department, weekly long working hours , reasons to work extended hours and number of patients assigned). This was in contrast with the study done by Ghalichi (2013) revealed that there was no significant association between education level on nurses` vigilance (Ghalichi, 2013). And in line with Boughatta (2014) study, points out vigilance and quality of life were significantly correlated to department and shift schedule (Boughatta, 2014).

Another cross sectional study was conducted to describe nurses in different positions work characteristics and determine the association between their vigilance during extended shifts (Stimpfel, 2015).

Stimpfel (2015) concluded that extended and night shifts work were significantly associated with nurses at different positions and with the demographic characteristics

6.2 Discussing the study domains

Nurses in this study express their vigilance level and perception of patient's safety during the long working hours as the following:

In the first domain “**level of vigilance during the long working hours**” the study results showed that the level of vigilance and patient safety is in an average score, this result is consistent with the study conducted in Tunisia in 2017 reported a moderate average for nurses` vigilance which was evaluated while starting the shift, during the half time of the work and at the end of the shift (Kraiem, 2016). Therefore, further studies may indicate different results.

This result is in contrast with the cross sectional study conducted in Tunisia; detect the harmful effects of night shift on sleep, vigilance and the quality of life of nurses. Boughattas (2014) concluded that the nurses' vigilance was significantly higher among day nurses while low among nurses who work extended shifts (I bid).

In our study the results showed that a small percentage of nurses fell asleep during the long working hours which is agrees with a descriptive study conducted in USA in 2008 reported that drowsiness and impaired alertness are not confined to the extended shifts, with almost small of these episodes occurring between 6 AM and midnight (Scott, 2008).

In addition, the results showed that half of the nurses remain awake most of the time during the extended shifts while few are not. This result is in contrast with the study conducted by Scott LD in 2008 finds out that almost two thirds of the participants struggled to stay awake at least once during the study period and 20% fell asleep at least once during their work shift (I bid).

A cross sectional study carried out in 2013 explored critical care unit managers' perceptions and experiences with their nursing staff's napping practices on night shift, offer valuable insights into the complexities and conflicts perceived by managers with respect to napping on night shift breaks by nursing staff. Staff and patient health and safety issues,

work and break expectations, experiences, strengths and deficits related to organizational napping resources and policy are considerations that will be instrumental in the development of effective napping strategies and guidelines (Edward, 2013).

A qualitative study in USA in 2015 was conducted to explore nurses' perceptions, experiences, barriers and safety issues related to napping/not napping during night shift. Concluded that taking a nap during night shift have positive impact on their personal health, safety and patient care issues during the long working hours (Fallis,2015). The results of these two studies are disagrees with our finding that small percentage of nurses` take a brief nap during long working hours , this can be attributes to the nurses agreement that taking a nap affects patient's safety.

Also the study results showed that nurses do not have problems in sleeping on weekends they are sleeping and wakening up without problems or need medications.

The results of the study showed that the percentage of medication administration mistakes may be nonexistent also a small percentage of errors in passing written or verbal hand-over that received after 7 p.m. were found. This can be attributes to the fact that clear reports from the nurse in the previous rotation can improve patients` safety. These results are in line with the study conduct in USA in 2008 concluded that no association between decreased vigilance and increased risk of errors was found (Scott LD, 2008). Also this is in consistence with a study conducted in Great Britain for a group of critical care nurses pointed that, when nurses work 12 hours there are only two hand-off periods, this decreases the potential for errors associated with poor communication at hand-off (Richardson, 2007).

In the second domain” patient safety level during the long working hours”

The study results showed that a moderate percentage of nurses are not wearing face mask if they have flue while dealing with patients, or washing their hands before and after giving care to the patient. This can be attributes as a proof that nurses have weakness knowledge about the importance of wearing face mask that can improves patients and their safety and the importance of washing their hands to prevent diseases. More awareness about hand hygiene must be given to the nurses. Moreover furthermore, these results are in line with the study conducted in multidisciplinary intensive care units in 3 different urban hospitals in Vancouver, in British Columbia; assess how nurses' sleep patterns are affected by work schedules and other factors. A total of 20 Critical care nurses completed daily sleep and

activity logs and a demographic survey and wore an actigraph to objectively measure sleep time for 14 days. Indicates that the degree of sleep deprivation adversely affects patients' safety and needs further study (Allen, 2014).

In addition, the study results showed that a high percentage of nurses changing the patient's position every 2 hours, alert to subtle changes in patient condition and check the bed rails .

Otherwise, the finding pointed that important patient information can be lost during long working hours including lack in checking handoff. This is in agreement with a study carried out in Spain in 2016, examine the relationship between the characteristics of nurses' work environments in hospitals in the Spanish National Health System (SNHS) with nurse reported quality of care and how care was provided by using different shifts schemes and analyzed the relationship between job satisfaction, burnout, sleep quality and daytime drowsiness of nurses and shift work. The findings stated that shift work is needed as rotating shift nurses and night shifts nurses seemed to provide less work perception and were less aware about patient's cases information (Gomez Garcia, 2016).

In the third domain” Patient Safety /Frequency of Events Reported”

The results of the study showed that high percent of nurses are willing to report any serious but not life threatening events during the long working hours. This result is in agreement with study conducted by Turnock (2014) concluded that many positive factors were identified about positive effects of the extended shifts, these included improved planning and prioritizing care, improved relationships with patients and good-quality time for work when nurses work 12 hours or more there are only two hand-off periods. This decreases the potential for errors, events reports associated with clear reporting from the previous shift nurse and obligations of patients' safety instructions (Turnock, 2014).

In the fourth domain” tasks affect vigilance and patients' safety”

Our finding pointed that the nurses have sufficient awareness about the tasks that can increase or decrease their level of vigilance. Therefore, organizing the work schedule is a highly needed to enhance contact time with the patient, listening to them , improving caring process as performing accurate clinical assessments , responds expediently thereby , this will improve the nurses wellbeing and patient safety.

Finally ,The nurses perception of patient safety and level of vigilance were satisfied among nurses` in both hospitals, the results shows significance difference between Palestine Medical Complex and al-Istishari Arab Hospital regarding nurses vigilance and the ratio was higher at Palestine Medical Complex. Therefore, it is necessary to adopt creative ways to improve nurses` vigilance at al- Istishari Arab hospital includes duty hour restrictions and fatigue countermeasures. Countermeasures of vigilance are actions that can be taken to prevent or treat on-the-job fatigue and thus prevent adverse consequences. Strategies in use to combat poor vigilance and prevent error may have merit for use with health care workers.

6.3 Recommendations

Workplace vigilance remains a critical issue in health care. Nurses` are professionally accountable for ensuring that they are fit to provide patient care and they should be proactive in minimizing patient and personal safety risks. Encouraged to collaborate with colleagues and employers to create responsible staffing patterns and work models that use strategies designed to reduce the risk threats to patient and personal safety caused by poor vigilance during long working hours (Cavaliere et al. 2015).

The study results had helped me to develop an in depth understanding of the problem and address it causes. Therefore, it led me to put tentative recommendations based on the study findings which might help healthcare providers, managers and professionals to set priorities, effective problem solving and quality improvement.

6.3.1 Recommendations for nurses

1. Getting as much sleep as possible before starting long working hours improves nurses' performance, prevents fatigue and keeps them alert and vigilant.
2. Taking a nap can maintain vigilance and alertness, providing nurses with a refreshed feeling.
3. Caffeine should be used sparingly and only in the early part of the shift to increase vigilance during work over the 12 hours.
4. Improve communication at shift handover to ensure that new shift nurses are fully aware of patients' condition that has arisen during the previous shift.

6.3.2 Recommendations for heads of critical care units at al-Istishari Arab hospital and Palestine Medical Complex

- 1- Consider increasing supervision during key periods of low vigilance, e.g. during the night, early morning, towards the end of long shifts and other periods of low alertness.
- 2- Tailored training and/or information regarding the risks associated with shift work should be available for nurses.
- 3- Limit consecutive long working days to a maximum of 4 days and make sure there is adequate rest time between successive shifts.
- 4- Make sure supervisors and team members with responsibility for shift-working arrangements are aware of the risks associated with shift work and can recognize shift work-related problems.

6.3.3 Recommendations for future researches

Several areas were emerged from this research and seem to be needed for further in depth assessment. These addressed the following:

- 1- Qualitative study to evaluate effects of long working hours among nurses' vigilance and patients' safety. Qualitative studies play an important role in explaining workers perceptions.
- 2- Repeated measurements and follow up studies to measure nurses level of vigilance during long working hours after interventions to improve the quality of care.
- 3- This study is limited to Ramallah district; therefore, there is a need to conduct other studies at other districts to make comparisons.

6.4 Summary

As I mentioned earlier, the aim of this Master's Thesis was to assess the effects of long working hours on nurses' vigilance and patients' safety. Like many research studies that attempt to tackle a fairly new idea, this was a small step towards better understanding the relationship between long working hours, nurses' vigilance and patients' safety. The conceptual framework discussed in this study identified several factors that affect nurses' vigilance during the extended shift. The literature review demonstrates the importance impact of long working hours among nurses in general and patients' safety. Also the literature supported the positive and negative effects of long working hours. The findings of this research, are not conclusive, Suggestions for further research was given that included conducting a qualitative study to evaluate nurses' vigilance during the long shifts. Although the results for this study did not demonstrate a favorable outcome regarding long working hours and nurses' vigilance, there was a statically significant relationship with working ≥ 40 h/week and there were different statical significance according to the level of vigilance between nurses in the targeted hospitals. Moreover, no association was found between long working hours and patient safety.

Finally, the study was significant because it provides critical care units heads with a foundation for creating partnerships with nurses all in an effort to deliver better health care outcomes included patients safety culture. Policy makers within hospitals that do not have decided appropriate working pattern for critical care units nurses must continue to research literature and benchmarks relative to critical care units so that appropriate treatment can be provided to patients also improving nurses health.

References

- AbuAmshah, M., (2014).Effects of Shift Work Paradigms on Job performance of Nurses in The Palestinian Health Sector.An-Najah National University, Palestine
https://scholar.najah.edu/sites/default/files/Majd%20Abu%20Amshah_0.pdf
- AbuRuz EM., Abu Hayeah MH, (January. 2017).Insomnia Induced by Night Shift Work is Associated with Anxiety, Depression, and Fatigue, among Critical Care Nurses. HIKARI Ltd. DOI: <http://www.m-hikari.com/asb/asb2017/asb1-4-2017/p/aburuzASB1-4-2017-2.pdf>
- Akerstedt, T., (1988). Sleepiness as a consequence of shift work. *Journal of Sleep research and sleep medicine*. 11,(1) 17-34. <http://dx.doi.org/10.1093/sleep/11.1.17>.
- Åkerstedt T, Axelsson J, Kecklund G, Lindqvist A, & Attefors R. (2003). Hormonal changes in satisfied and dissatisfied shift workers across a shift cycle. *Journal of Applied Physiology*, 95, 2099-2105. DOI: <https://books.google.ps/books?isbn=184855544X>
- Al-Ameri MHI (2017) Night Shift and its Impact upon the Quality of Life of Nurses Working at the Teaching Hospitals of the Medical City Complex in Baghdad City, Iraq. *J Nurse Care* 6: 414. doi:10.4172/2167-1168.1000414
- Alhola, P., & Polo-Kantola, P. (2007). Sleep deprivation: Impact on cognitive performance. *Neuropsychiatric Disease and Treatment*, 3(5), 553–567.
- AL-Ishaq M. (2008)Nursing Perception of Patient Safety at Hamad Medical Corporation in the State of Qatar.
<https://scholarworks.iupui.edu/bitstream/.../All%20Moza%27s%20Dissertation.pdf>
- Allen,A., Park,J., Adhami,N., Adhami,S., Tholin,H., Dodek,P., Rogers,A., & Ayas,N.(2014). Impact of work schedules on sleep duration of critical care nurses. *Am J Crit Care*. 2014 Jul;23(4):290-5. doi: 10.4037/ajcc2014876.

- Alshahrani, S. M., Baqays, A. A., Lanai, A. A., AlAngari, A. M., & AlHadi, A. N. (2017). Impact of shift work on sleep and daytime performance among health care professionals. *Saudi Medical Journal*, 38(8), 846–851. <http://doi.org/10.15537/smj.2017.8.19025>
- Anbazhagan S, Ramesh N, Nisha C, Joseph B (2016). Shift work disorder and related health problems among nurses working in a tertiary care hospital, Bangalore, South India. *Indian Journal of Occupational and Environmental Medicine*. 20 .1 P35-38 DOI: 10.4103/0019-5278.183842
- Anderson, P. (2003). Improving Patient Safety: Insights from American, Australian and British healthcare. *Quality & Safety in Health Care*, 12(3), 235. <http://doi.org/10.1136/qhc.12.3.235>
- Anderson LL, Chen PY, Finlinson S, Krauss AD, Huang YE. Roles of safety control and supervisory support in work safety. Paper presented at: Annual Conference of the Society for industrial and Organizational Psychology, 2004; Chicago, IL.
- Asefzadeh, S., Yarmohammadian, M. H., Nikpey, A., & Atighechian, G. (2013). Clinical Risk Assessment in Intensive Care Unit. *International Journal of Preventive Medicine*, 4(5),592–598. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3733191/>
- Attia F, Attia M. (2016). Effect of Shift Rotation on Sleep Quality and Associated Health Problems among Nurses at Asser Hospital KSA. *International Journal of Nursing Science*, Vol. 6 No. 2, 2016, pp. 58-65. doi: 10.5923/j.nursing.20160602.04
- Ayed A, Thulth A, Sayej S. (2015). Impact of Night Shift and Training Development Factors on Performance of Professional Nurses in North West Bank Governmental Hospitals. *Journal of Education and Practice* 2015, 6, (27), 50-60 <https://files.eric.ed.gov/fulltext/EJ1077378.pdf>
- Bae Sh. (2013). Presence of Nurse Mandatory Overtime Regulations and Nurse and Patient Outcomes. *NURSING ECONOMIC\$*/March-April 2013/Vol. 31/No. 2 <https://www.nursingeconomics.net/ce/2015/article31025989.pdf>

- Bae Sh. (2016). Nurse practitioners' work hours and overtime: How much, and under what working conditions. *Journal of the American Association of Nurses Practitioner*. 28(3):138-43. Doi: 10.1002/2327-6924.12285. Epub 2015 Jun 23
- Bae, M.-J., Song, Y.-M., Shin, J.-Y., Choi, B.-Y., Keum, J.-H., & Lee, E.-A. (2017). The Association between Shift Work and Health Behavior: Findings from the Korean National Health and Nutrition Examination Survey. *Korean Journal of Family Medicine*, 38(2), 86–92. <http://doi.org/10.4082/kjfm.2017.38.2.86>
- Baldwin DC Jr, Daugherty SR, Tsai R, Scotti MJ Jr. (November.2003). A national survey of residents' self reported work hours: thinking beyond specialty. *Acad Med*. 2003; 78:1154-1163. DOI: <https://www.ncbi.nlm.nih.gov/pubmed/14604880>
- Ballard, K. (September 30, 2003). "Patient Safety: A Shared Responsibility". *Online Journal of Issues in Nursing*. Vol. 8 No. 3, Manuscript 4. Available: www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Volume82003/No3Sept2003/PatientSafety.aspx
- Ball J, Maben J, Murrells T, Day T, Griffiths P (2014) '12-hour shifts: prevalence, views and impact'. National Nursing Research Unit, King's College London. https://www.researchgate.net/.../303568343_12hour_shifts_prevalence_views_
- Banakhar, M., (2017).The impact of 12-hour shifts on nurses' health, wellbeing, and job satisfaction: A systematic review. *Journal of Nursing Education and Practice* 2017, Vol. 7, No. 11 DOI: 10.5430/jnep.v7n11p69
- Banks, S., & Dinges, D. F. (2007). Behavioral and physiological consequences of sleep restriction. *Journal of Clinical Sleep Medicine*, 3, 519-528. <https://waubrafoundation.org.au/resources/banks-s-dinges-d-f-behavioral-and-physiological-consequences-sleep-restriction/>
- BARKER L.M. & NUSSBAUM M.A. (2011) Fatigue, performance and the work environment: a survey of registered nurses. *Journal of Advanced Nursing* 67 (6), 1370–1382 <https://doi.org/10.1111/j.1365-2648.2010.05597.x>

- Batak T, Gvozdenović L, Bokan D and Bokan D. The impact of nurses' shift work on the fatigue level. *South Eastern Europe Health Sciences Journal* 2013; 3, (2) http://unvi.edu.ba/SEEHSJ/volume_3_no_2/01_Batak_SEEHSJ_70_13.pdf
- Bertram, D. "Likert Scales." Retrieved July 18, 2016 from: <http://my.ilstu.edu/~eostewa/497/Likert%20topic-dane-likert.pdf>
- Boughattas, W. , Maalel, O. , Chikh, R. , Maoua, M. , Houada, K. , Braham, A. , Rhif, H. , Chatti, S. , Debbabi, F. , Dogui, M. and Mrizak, N. (2014) Hospital Night Shift and Its Effects on the Quality of Sleep, the Quality of Life, and Vigilance Troubles among Nurses. *International Journal of Clinical Medicine*, **5**, 572-583. doi: [10.4236/ijcm.2014.510079](https://doi.org/10.4236/ijcm.2014.510079).
- Boll J. (2014) Development of a Measure of Nurse Vigilance from the Patient's Perspective: A Content Validity Study. *The Ames Library.P* (1-45). DOI: http://digitalcommons.iwu.edu/nursing_honproj/45
- Bonnefond, A., Härmä, M., Hakola, T., Sallinen, M., Kandolin, I. & Virkkala, J (2007) Interaction of Age with Shift-Related Sleep-Wakefulness, Sleepiness, Performance, and Social Life, *Experimental Aging Research*, 32:2,185-208, DOI: 10.1080/03610730600553968
- Brasaitė I, Kaunonen M, Martinkėnas A, Mockienė V, Suominen T. (2016). Health care professionals' skills regarding patient safety. *Elsevier Journal. Medicine* 52 (2016) 250 – 256 <http://dx.doi.org/10.1016/j.medic.2016.05.004>.
- Brown GL, Wieroney M, Blair L, Zhu Sh, Warren J, Scharf MS & Hinds SP. (2014). Measuring subjective sleepiness at work in hospital nurses: validation of a modified delivery format of the Karolinska Sleepiness Scale. *Springerlink*. 18, 4, pp 731–739. <https://link.springer.com/article/10.1007%2Fs11325-013-0935-z>
- Carayon P, Gurses AP. Nursing Workload and Patient Safety—A Human Factors Engineering Perspective. In: Hughes RG, editor. *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Rockville (MD): Agency for Healthcare

- Research and Quality (US); 2008 Apr. Chapter 30. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK2657/>
- Caruso, C.C., Hitchcock, E.M., Dick, R.B., Russo, J.M., & Schmit, J.M. (2004). Overtime and extended work shifts: Recent findings on illnesses, injuries, and health behaviors. <http://www.cdc.gov/niosh/docs/2004-143/pdfs/2004-143.pdf>
- Caruso, C. C. (2014). Negative Impacts of Shift work and Long Work Hours. *Rehabilitation Nursing: The Official Journal of the Association of Rehabilitation Nurses*, 39(1), 16–25. <http://doi.org/10.1002/rnj.107>
- Chang SY, Wu HY, Su FSH, Hsu YCh & Chen LH. (2013). Factors related with the ability to maintain wakefulness in the daytime after fast and forward rotating shifts. *Kaohsiung Journal of Medical Sciences* (2013) 29, 611e616. <http://dx.doi.org/10.1016/j.kjms.2013.01.012>
- ChangY, Chen H, HSU Ch, Su, ShLiu Ch. (2013). Nurses working on fast rotating shifts overestimate cognitive function and the capacity of maintaining wakefulness during the daytime after a rotating shift. *Sleepmedicine Journal* .14(7):605- DOI: [http://www.sleep-journal.com/article/S1389-9457\(13\)00126-3/fulltext](http://www.sleep-journal.com/article/S1389-9457(13)00126-3/fulltext)
- Chien YL, Huang N, Chiou TSH, Lo YW. (2016). Long work hours and chronic insomnia are associated with needle stick and sharps injuries among hospital nurses in Taiwan: A national survey. *International journal of nursing studies*. 64, P (130–136). <http://dx.doi.org/10.1016/j.ijnurstu.2016.10.007>
- Chung HM , Kuo BT, Hsu N, Chuo K, Chu H. & Yang HC.(2011). Comparison of Sleep-related Cardiac Autonomic Function between Rotating-shift and Permanent Night-shift Workers. *Industrial health Journal*. 49, P 589–596.<http://doi.org/10.2486/indhealth.MS1259>
- Clarke SP, Donaldson NE. Nurse Staffing and Patient Care Quality and Safety. In: Hughes RG, editor. Patient Safety and Quality: An Evidence-Based Handbook for Nurses. Rockville (MD): Agency for Healthcare Research and Quality (US); 2008 Apr. Chapter 25. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK2676/>

- Cope P G, Nelson L A, Patterson S E. (2008). Patient Safety and Quality an Evidence-Based Handbook for Nurses. Agency for Healthcare Research and Quality (US). DOI: <https://www.ncbi.nlm.nih.gov/books/NBK2651/#!po=16.6667>
- Costa, G., (2016). Introduction to Problems of Shift Work. Springer International Publishing Switzerland.
- DaSilva MK, DeMartino FM, Viana OM, Bezerra MC, Miranda NF. (2017). Relationship between work shifts and quality of sleep of nurses: a descriptive study. *Online Brazilian Journal of Nursing*. (16). (1) P (1-5). DOI: <http://www.objnursing.uff.br/index.php/nursing/article/view/5577/html>
- Davies, H., Nutley, S., & Mannion, R. (2000). Organisational culture and quality of health care. *Quality in Health Care: QHC*, 9(2), 111–119. <http://doi.org/10.1136/qhc.9.2.111>
- Drews F. A. (2013). Human factors in critical care medical environments. *Reviews of Human Factors and Ergonomics*, 8, 103–148. doi: 10.1177/1557234X13493250 [[Cross Ref](#)]
- Doran, D., Jeffs L., Rizk, P., Laporte, D., Chilcote A. & BAI Y.Q. (2015) *Journal of Nursing Management* 23, 859–867 DOI: 10.1111/jonm.12227 https://www.researchgate.net/publication/311335127_
- Ebright, P., Patterson, E., Chalko, B., & Render, M. (2003). Understanding the complexity of Registered nurse work in acute care settings. *Journal of Nursing Administration*, 33, 630-638. https://journals.lww.com/jonajournal/Abstract/2003/12000/Understanding_the_Complexity_of_Registered_Nurse.4.aspx
- Edwards M.P., McMillan D.E., & Fallis, W.M. (2013). Napping during breaks on night shift: Critical care nurse managers' perceptions. *Dynamics Canadian Association of Critical Care Nurses*, 24(4), 30-35. DOI: chemshark.com/nursing/wp-content/uploads/2014/.../NursingNappingNightShift.pdf

- Ellis, J. R. (2008). Quality of care, nurses' work schedules, and fatigue: A white paper. Seattle, WA: Washington State Nurses Association
<https://www.wsna.org/assets/entry-assets/Nursing-Practice/2015/fatigue/Fatigue-White-Paper.pdf>
- Elsous A, Sari A, Rashidian A, Aljeesh Y, Radwan A, & AbuZaydeh H. (2016). A cross sectional study to assess the patient safety culture in the Palestinian hospital baseline assessment for quality improvement. *Journal of the Royal Society of Medicine*, (7)12) P (1–12) DOI:
- Fagerstorm, L., Rainio, A., Rauhala, A. and Nojonen, K., (2000). Validation of a new method for patient classification, the Oulu Patient Classification. *Journal of Advanced Nursing* 31, 2: 481-490
- Fallis, McMillan, Edwards (April.2011). Napping during night shift: practices, preferences, and perceptions of critical care and emergency department nurses. *The journal for high acuity, progressive and critical care nurses*. (31)(2el 11).
Doi: 10.4037/ccn2011710
- Ferreira ST, Moreira ZC, Guo J, Noce F. (2017). Effects of a 12-hour shift on mood states and sleepiness of Neonatal Intensive Care Unit nurses. *Journal of School of nursing* (51). DOI : http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0080-62342017000100401&lng=en&nrm=iso&tlng=en
- Fernandez DJ, Portela FL, Rotenberg, Griep HR. (2013). Working hours and health behavior among nurses at public hospitals. *Rev. Latino-Am. Enfermagem*. 21(5):1104-11.
<https://www.ncbi.nlm.nih.gov/pubmed/24142219>
- Fernandes JC, Portela LF, Griep RH, Rotenberg L. (Novemeb4.2015). Working hours and health in nurses of public hospitals according to gender. *Rev Saude Publica. Journal*2017; 51:63. DOI: <https://doi.org/10.1590/S1518-8787.2017051006808>
- Flo E, Pallesen S, Åkerstedt T, et al. Occup Environ. Shift-related sleep problems vary according to work schedule. (2013). *Med Published Online* .doi:10.1136/oemed-2012-10109

- Fentianah AN, (2012). Impact of Nursing Competence on Quality of Nursing Care and Safety of Nursing Practice. DAI-B 74/01(E), Dissertation Abstracts International. <https://pqdtopen.proquest.com/doc/1041268595.html?FMT=ABS>
- Folkard S. (2008b). Shift work, safety, and aging. *The Journal of Biological and Medical Rhythm Research*, (25) (2008), (2-3)183-198. DOI: www.tandfonline.com/doi/abs/10.1080/07420520802106694
- Ghahramanian, A., Rezaei, T., Abdullahzadeh, F., Sheikhalipour, Z., & Dianat, I. (2017). Quality of healthcare services and its relationship with patient safety culture and nurse-physician professional communication. *Health Promotion Perspectives*, 7(3), 168–174. <http://doi.org/10.15171/hpp.2017.30>
- Ghalichi L, Pournik O, Ghaffari M, Vingard E. Sleep Quality among Health Care Workers. *Arch Iran Med*. 2013; 16(2): 100 – 103. doi: 013162/AIM.0010
- Griffiths P, Dall’Ora Ch, Simon M, Ball J, Lindqvist R, Rafferty A, Schoonhoven L, Tishelman C and Aiken A.(2014). Nurses’ Shift Length and Overtime Working in 12 European Countries. *Medical Care Journal* 2014; 52: 975–981 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4196798/>
- Greenwood B. (2016). What Are the Working Hours Per Week for a Pediatric Nurse? The nest website: <https://woman.thenest.com/working-hours-per-week-pediatric-nurse-22991.html>
- Grove, S., Burns, N., Gray, J. (2013): The Practice of Nursing Research: Appraisal, Synthesis and Generation of Evidence, seven Ed. Elsevier Health Sciences, USA <https://books.google.ps/books?id=r32jPNVYIacC&printsec=frontcover&hl=ar#v=onepage&q&f=false>
- Guerra PC, Oliveira NF, Terreri MTRA, Len CA. Sleep, quality of life and mood of nursing professionals of pediatric intensive care units. *Rev Esc Enferm USP*. 2016; 50(2):277-283. DOI: <http://dx.doi.org/10.1590/S0080-623420160000200015>
- Gómez-García T, Ruzafa-Martínez M, Fuentelsaz-Gallego C, Madrid J, Rol AM, Martínez-Madrid, JM & Moreno-Casbas T. (2016). Nurses' sleep quality, work

- environment and quality of care in the Spanish National Health System: observational study among different shifts. *BMJ open Journal* (6). (8)P (1-11). DOI: <http://bmjopen.bmj.com/content/6/8/e012073>
- Hafner, Marco, Martin Stepanek, Jirka Taylor, Wendy M. Troxel, and Christian Van Stolk, Why sleep matters — the economic costs of insufficient sleep: A cross-country comparative analysis. Santa Monica, CA: RAND Corporation, 2016. https://www.rand.org/pubs/research_reports/RR1791.html
- Haluza D, Bauböck MV, Blasche C. (2017) Work-related self-assessed fatigue and recovery among nurses. *International Archives of Occupational and Environmental Health*. Springer Link. 90, (2) pp 197–205. <https://link.springer.com/article/10.1007%2Fs00420-016-1187-6>
- Hirsch Allen JA, Park EJ, Adhami N. (July.2014).Impact of Work Schedules on Sleep Duration of Critical Care Nurses. *American Journal of Critical Care*. (23). (4) P (290-295). DOI: <http://ajcc.aacnjournals.org/>
- Horton DC. (2015).The Effects of the Night Shift on Nursing Staff of an Inpatient Hospice Facility. Walden University Scholar Works. DOI: <http://scholarworks.waldenu.edu/dissertations>
- Holm, K., and LieweHyn, J. (1986).Nursing Research for Nursing Practice, Philadelphia: W.B. Saunders Company
- Jaradat YM, Nielsen MB, Kristensen P, Bast-Pettersen R. Shift work, mental distress and job satisfaction among Palestinian nurses. *Occup Med (Lond)*. 2017; 67:71–74. doi:10.1093/occmed/kqw128
- Jennifer R, Gray, Susan K, Grove, Nancy Burns .(2013). The Practice of Nursing Research - E-Book: Appraisal, Synthesis, and.P (156). DOI: <https://books.google.co.il/books?isbn=032329331X>
- Ju-Yeon U, Young L, Ji Ch, Yeon K, Joo H, Hee L , Kyung K and Hee K.(2014). Impact of 12-hour Shifts on Job Satisfaction, Quality of Life, Hospital Incident Reporting,

- and Overtime Hours in a Pediatric Intensive Care Unit. *J Korean Acad Nurs Adm* 2014 Vol. 20 No. 4, 353-361, <http://dx.doi.org/10.1111/jkana.2014.20.4.353>
- Kalisch B, Lee KH. (2014). Nurse Staffing Levels and Teamwork: A Cross-Sectional Study of Patient Care Units in Acute Care Hospitals. *Journal of Nursing Scholar* 43, 1:82-88 <https://doi.org/10.1111/j.1547-5069.2010.01375.x>
- Kaliyaperumal D (2017). Effects of Sleep Deprivation on the Cognitive Performance of Nurses Working in Shift. *Journal of Clinical and Diagnostic Research*. 2017 Aug, Vol-11(8): CC01-CC03 DOI: 10.7860/JCDR/2017/26029.1032
- Karhula K, Harma M, Sallinen M, Hublinn Ch, Virkkala J, Kivimaki M, Vahter J & Puttonen S. (2013). Job strain, Sleep and Alertness in shift working Health care professionals. *Industrial health journal*. 51:406-416. https://www.jstage.jst.go.jp/article/indhealth/51/4/51_2013-0015/_article
- Kazemi, R., Haidarimoghadam, R., Motamedzadeh, M., Golmohamadi, R., Soltanian, A., & Zoghipaydar, M. R. (2016). Effects of Shift Work on Cognitive Performance, Sleep Quality, and Sleepiness among Petrochemical Control Room Operators. *Journal of Circadian Rhythms*, 14, 1. <http://doi.org/10.5334/jcr.134>
- Khalid Sh. (2015). Perceived Social Support and Work Motivation of Day And Night Shift Nurses. *Pak Armed Forces Med J* 2015; 65(2): 257-61 pafmj.org/pdfs/April-2015/Article_22.pdf
- Khalil A, Barhoush Sh, Joori M, Diab M. (2016). Effect of Sleepiness and Fatigue on Nursing Performance among Intensive Care Unit and Coronary Care Unit Nurses in West Bank. (Published BS thesis). Al-Najah National University <https://fmhs.najah.edu/node/2844>
- Khammarnia, M., Setoodehzadeh, F., (2016). Medical Error as a Challenge in Iran's Health System. *Health Scope Journal* .2017 February; 6(1):e39743 doi: 10.17795/jhealthscope-39743

- Kim, W., Kim, T. H., Lee, T.-H., Choi, J. W., & Park, E.-C. (2016). The impact of shift and night work on health related quality of life of working women: findings from the Korea Health Panel. *Health and Quality of Life Outcomes*, 14, 162. <http://doi.org/10.1186/s12955-016-0564-x>
- Kraiem, A.M., Omrane, A., Boussaid, A.M., Kacem, I., Cheik, R.B., Khalfallah, T. and Bouzgarrou, L. (2017) Vigilance Disorders in Permanent Night Workers: The Case of the Medical Staff. *Open Journal of Nursing*, 7, 409-418. <https://doi.org/10.4236/ojn.2017.73032>
- Kutney-Lee, A., McHugh, M. D., Sloane, D. M., Cimiotti, J. P., Flynn, L., Neff, D. F., & Aiken, L. H. (2009). Nursing: A Key To Patient Satisfaction. *Health Affairs (Project Hope)*, 28(4), w669–w677. <http://doi.org/10.1377/hlthaff.28.4.w669>
- Kooken, W. (2008). Vigilance experiences: Cancer patients, families, and nurses (Doctoral dissertation). ProQuest. <http://www.asaninst.org/wpcontent/cache/essay2017/proquest-dissertations-and-theses-purdue>
- Liu KCh, Chang SY, Chen LH, HsuY, Ch SuF, Sh, Hsu Ch. (2013). Nurses working on fast rotating shifts overestimate cognitive function and the capacity of maintaining wakefulness during the daytime after a rotating shift. *Sleep Medicine Journal*. 14, 7, P (605–613). DOI: <http://dx.doi.org/10.1016/j.sleep.2013.03.011>
- LockleyWS, Barger KL, AyasTN, Rothschild MJ, Landrigan P Ch. (2007). Effects of Health Care Provider Work Hours and Sleep Deprivation on Safety and Performance. *The Joint Commission Journal on Quality and Patient Safety* (33). P (7-18). DOI: <https://www.jointcommission.org/assets/1/18/S2-JQPS-11-07S-lockley.pdf>
- Loef B, Hulsege G, Wendel-Vos GCW, et al. *Occup Environ Med* 2017;74:328–335 doi:10.1136/oemed-2016-103878
- Matre D, Knardahl S, Nilsen KB. (2017) Night-shift work is associated with increased pain perception. *Scandinavian Journal Work Environ Health*. 2017; 43(3):260–268. doi:10.5271/sjweh.3627. DOI: www.ncbi.nlm.nih.gov/pubmed/28259894

- Matsumoto M, Lee B, Tozato F, Gennai K, Shiihara Y. (2014). Objective and Subjective Measures of Sleep of Shift-working Nurses' -*Stage Journal*. 56 (2014) No. 3 p. 67-73. <http://doi.org/10.1539/sangyoeisei.B13013>
- Mark, R., (1996) *Research Made Simple: A Handbook for Social Workers*, Thousand Oak, London, New Delhi: Sage Publication.
- Massey D, Chaboyer W. and Adnerson V. (2017). What factors influence ward nurses' recognition of and response to patient deterioration? An integrative review of the literature, *Nurs Open* (2017). Vol.4 URL https://www.scipedia.com/public/Massey_et_al2016a
- Meyer G, Lavin M A. (June 23, 2005). Vigilance: The Essence of Nursing. *OJIN: The Online Journal of Issues in Nursing*. 10, 1.P (1-9). DOI: 10.3912/OJIN.Vol10No03PPT01
- Murphy M, Timmins F. (2010). The need for vigilance, effective communication and collaboration in medication management. DOI: www.infantgrapevine.co.uk/pdf/inf_048_ila.pdf
- Montenegro HJ. (2016). Perceived versus Observed Patient Safety Measures in a Critical Care Unit from a Teaching Hospital in Southern Colombia. *Hindawi Journal*. (2016)P (1-7). DOI: <https://www.hindawi.com/journals/ccrp/2016/2175436/>
- Moreton A. Safety during night shifts: a cross-sectional survey of junior doctors' preparation and practice. *BMJ Open* 2013; 3:e003567. doi: 10.1136/bmjopen-2013-003567
- Nagai M, Morikawa Y, Kitaoka K, Nakamura K, Sakurai M, Nishijo M, Hamazaki YM, aruzeni Sh, & Nakagawa H. (2011). Effects of fatigue on immune function in nurses performing shift work. *Journal of occupational health*. 53, 312-319 <https://www.ncbi.nlm.nih.gov/pubmed/21778660>

- NCPS (2002.) National Center for Patient Safety
<https://psnet.ahrq.gov/resources/resource/1453/national-center-for-patient-safety-ncps--->
- Niu, SH., Miao, N., Liao, Y., Chi, M., Chung, M. & Chou, K. (March.15.2017). Sleep Quality Associated With Different Work Schedules: A Longitudinal Study of Nursing Staff. *SAGE Journals*. (19). (4).P (1-19). DOI: journals.sagepub.com/doi/abs/10.1177/1099800417695483
- NQF Patient Safety Terms and Definitions In order to standardize. (2009). DOI: https://www.qualityforum.org/Topics/Safety_Definitions.aspx
- Ogume Y. (2013).Effects of rotating shift schedule on nurses` vigilance measured by the psychomotor vigilance task. *Asian Pacific Journal of Disease Management*2013; 7(3-4), 35-43. https://www.jstage.jst.go.jp/article/apjdm/7/3-4/7_35/_article
- Olds M D, Clarke S. (2010). The Effect of Work Hours on Adverse Events and Errors in Health Care. DOI: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2910393/>
- Oriyama, S., Miyakoshi, Y., & Kobayashi, T. (2014). Effects of Two 15-min Naps on the Subjective Sleepiness, Fatigue and Heart Rate Variability of Night Shift Nurses. *Industrial Health*, 52(1), 25–35. <http://doi.org/10.2486/indhealth.2013-0043>
- Pilcher JJ. (2013). Changes in nurses’ decision making during a 12-h day shift. *Occupational Medicine Journal*. 2013; 63:60–65. doi:10.1093/occmed/kqs189
- Polit, D.F. and Hungler, B.P.(1999).Nursing Research: Principles and Methods, Six Edition, Philadelphia, New York, Baltimore: Lipincott.
- QSEN Institute. (2014): Quality Improvement. USA (<http://qsen.org/quality-improvement/28.2.2018>).
- Rajaratnam Sh, Ftouni S, Sletten LT, Howard, Anderson, Lenne´ G.M.& Lockley WS. (2013). Objective and subjective measures of sleepiness and their associations with on-road driving events in shift workers. *Journal of sleep res.*22, P58-69. DOI: 10.1111/j.1365-2869.2012.01038.x

- Ramadan, M. Z., & AL-Saleh, K. S. (2014). The Association of Sleep Deprivation on the Occurrence of Errors by Nurses Who Work the Night Shift. *Current Health Sciences Journal*, 40(2), 97–103. <http://doi.org/10.12865/CHSJ.40.02.03>
- Reinke L, O'zbay Y, Dieperink W, Tulleken EJ. (Feb.12.2015).The effect of chronotype on sleepiness, fatigue, and psychomotor vigilance of ICU nurses during the night shift. *Intensive Care Medicine journal*. (41)(4)(657–666). DOI: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4392115/>
- Richardson, A., Turnock, C., Harris, L., Finley, A., & Carson, S. (2007). A study examining the impact of 12-hour shifts on critical care staff. *Journal of Nursing Management*. 15(8), 838-46. <https://doi.org/10.1111/j.1365-2934.2007.00767.x>
- Rogers, A. E., Hwang, W. T., Scott, L. D., Aiken, L. H., & Dinges, D. F. (2004). The working hours of hospital staff nurses and patient safety. *Health Affairs*, 23(4), 202-212. DOI: 10.1377/hlthaff.23.4.202
- Rosen IM, Gimotty PA, Shea JA, Bellini LM. (Jan.2008). Evolution of sleep quantity, sleep deprivation, mood disturbances, empathy, and burnout among interns. *Acad Med*. 2006; 81(1):82-85. DOI: <https://www.ncbi.nlm.nih.gov/pubmed/16377826>
- Rubiano MA, Montenegro HJ, Romero FA, Tejada AP & Olaya XS. (2016). Perceived versus Observed Patient Safety Measures in a Critical Care Unit from a Teaching Hospital in Southern Colombia. *Critical Care Research and Practice* 2016, 2175436, 7 pages. <http://dx.doi.org/10.1155/2016/2175436>
- Saksvik, J., Bjorvatn B, Hetland H, Sandal GM, Pallesen S. (2011). *Sleep Medicine Reviews*. 2011 Aug; 15(4):221-35. doi: 10.1016/j.smrv.2010.07.002. Epub 2010 Sep 20
- Sallinen M, Kecklund G. (2010). Shift work, sleep, and sleepiness differences between shift schedules and systems. *Scandinavian Journal of Work, Environment & Health*, 36, 121-133. DOI: www.sjweh.fi/download.php?abstract_id=2900&file_nro=1

- Sammer, C., James, B., (September 30, 2011) "Patient Safety Culture: The Nursing Unit Leader's Role" *OJIN: The Online Journal of Issues in Nursing* Vol. 16, No. 3, Manuscript 3.
- Sauter, C., Danker-Hopfe, H., Loretz, E., Zeithofer, J., Geisler, P., and Popp, R. (2013). The assessment of vigilance: normative data on the sustained attention test. *Sleep Medicine*, 14, 542-548
- Scott, L.D., Rogers, A.E., Hwang, W.-T., Zhang, Y., 2008. Effects of critical care nurses' work hours on vigilance and patients' safety. *American Journal of Critical Care*. 15, 30-37. DOI: <http://ajcc.aacnjournals.org/content/15/1/30.long>
- Scott, L.D., Hofmeister, N., Rogness, N., Rogers, A.E., 2010. An Interventional Approach for Patient and Nurse Safety: A Fatigue Countermeasures Feasibility Study. *Nursing Research*. 59, 250-258.
- Scholtz, S., Nel, E. W., Poggenpoel, M., & Myburgh, C. P. H. (2016). The Culture of Nurses in a Critical Care Unit. *Global Qualitative Nursing Research*, 3, 2333393615625996. <http://doi.org/10.1177/2333393615625996>
- Schluter JP, Turner C, Benefer Ch., (2012). Long working hours and alcohol risk among Australian and New Zealand nurses and midwives: A cross-sectional study. *International journal of nursing studies*. 49, 6, P (701–709). DOI: <http://dx.doi.org/10.1016/j.ijnurstu.2012.01.005>
- Seitz, A., (2016) Impact of Nurse Fatigue and Nursing Handoffs on Patient and Nurse Safety. University of Texas at Tyler, USA https://scholarworks.uttyler.edu/cgi/viewcontent.cgi?article=1063&context=nursing_grad
- Shahriari, M., Shamali, M., & Yazdannik, A. (2014). The relationship between fixed and rotating shifts with job burnout in nurses working in critical care areas. *Iranian Journal of Nursing and Midwifery Research*, 19(4), 360–365
- Shen J, Barbera J, Shapiro CM. Distinguishing sleepiness and fatigue: focus on definition and measurement. *Sleep Rev*. 2006; 10(1):63–76

- Smith-Coggins R, Howard KS, Mac TD, Wang C, Kwan Sh, Rosekind RM, Sowb Y, Balise R, Levis J., & Gaba MD. (2006). Improving Alertness and Performance in Emergency Department Physicians and Nurses: The Use of Planned Naps. *Annals of Emergency Medicine Journal*. 48, 5, P (596–604.e3).
<http://dx.doi.org/10.1016/j.annemergmed.2006.02.005>
- Smith-Miller, C., Shaw-Kokot, J. Curro, B., Jones, C., (2014). An integrated review. Fatigue among nurses in acute care settings. *The Journal of Nursing Administration*, 44(9), 487–493
- Spurgeon, A., Harrington, J. M., & Cooper, C. L. (1997). Health and safety problems associated with long working hours: a review of the current position. *Occupational and Environmental Medicine*, 54(6), 367–375
- Surani S, Hesselbacher S, Guntupalli B, Surani S, Subramanian S. (Dec. 2015). Sleep Quality and Vigilance Differ Among Inpatient Nurses Based on the Unit Setting and Shift Worked. *Journal of Patient Safety* (11).94).P (215-220). DOI: http://journals.lww.com/journalpatientsafety/Abstract/2015/12000/Sleep_Quality_and_Vigilance_Differ_Among_Inpatient.6.aspx
- Stanojević C, Simić S, Milutinović D. (2016). Health Effects of Sleep Deprivation on Nurses Working Shifts. *Researchgate. Med Pregl* 2016; LXIX (5-6): 183-188. Novi Sad: maj-juni. DOI: 10.2298/MPNS1606183S
- Stimpfel, A. W., Sloane, D. M., & Aiken, L. H. (2012). The Longer The Shifts For Hospital Nurses, The Higher The Levels of Burnout And Patient Dissatisfaction. *Health Affairs (Project Hope)*, 31(11), 2501–2509.
<http://doi.org/10.1377/hlthaff.2011.1377>
- Stimpfel, A. W., & Aiken, L. H. (2013). Hospital Staff Nurses' Shift Length Associated With Safety and Quality of Care. *Journal of Nursing Care Quality*, 28(2), 122–129.
<http://doi.org/10.1097/NCQ.0b013e3182725f09>

- Stimpfel, A. W., Lake, E. T., Barton, S., Gorman, K. C., & Aiken, L. H. (2013). How Differing Shift Lengths Relate to Quality Outcomes in Pediatrics. *The Journal of Nursing Administration*, 43(2), 95–100.
<http://doi.org/10.1097/NNA.0b013e31827f2244>
- Stone, Hughes, Dailey. (April.2008). Creating a Safe and High-Quality Health Care Environment. Agency for healthcare research and quality. Patient safety and quality An Evidence-Based Handbook for Nurses. DOI:
<https://www.ncbi.nlm.nih.gov/books/NBK2651/>
- Tao FM, Li BCh, Zhang Li. (2016). Influencing Factors for Sleep Quality Among Shift-working Nurses: A Cross-Sectional Study in China Using 3-factor Pittsburgh Sleep Quality Index. *Asian Nursing Research Journal*. (10), 4, Pages 277-282.
<https://doi.org/10.1016/j.anr.2016.09.002>
- Toode K. (2015). Nurses' Work Motivation Essence and associations. Published thesis. *University of Tampere*. <https://www.hrhresourcecenter.org/node/6501>
- Tran, D. T., & Johnson, M. (2010). Classifying nursing errors in clinical management within Australian hospital. *International Nursing Review*, 57(4), 454-462.
doi:10.1111/j.1466-7657.2010.00846.x
- Trinkoff AM; Johantgen M; Storr CL; Gurses AP; et al. Nurses' work schedule characteristics, nurse staffing, and patient mortality. *Nurs Res*. 2011; 60(1)1-8: 8-Jan doi: 10.1097/NNR.0b013e3181fff15d
- Uhlig, BL., Sand, T., Odegard, S., Haagen, K., (2014). Prevalence and associated factors of DSM-V insomnia in Norway. *Sleep Medicine Journal* 15 (2014)708-713 DOI: 10.1016/j.sleep.2014.01.018
- University of Rochester medical center (2018). Hypersomnia.USA(<https://www.urmc.rochester.edu/encyclopedia/content.aspx?contenttypeid=34&contentid=18342-1>)

- Walter L,(Jan 18, 2011). (ESN today). Long Working Hours for Nurses Can Lead to Increase in Patient Mortality. <http://www.ehstoday.com/health/news/working-hours-nurses-patient-mortality-1200>
- Weinstein, S., (2016). Nurse fatigue takes toll on patient care. *Reflection on nursing leadership*. https://www.reflectionsonnursingleadership.org/features/more-features/Vol41_1_nurse-fatigue-takes-toll-on-patient-care
- Zhang B, WingY. (Jan.2006). Sex differences in insomnia: a meta-analysis. *Sleep*, 29, 85-93. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/16453985>
- Zhang Y, Duffy FJ, Castillero D. (2017). Do sleep disturbances mediate the association between Work-family conflict and depressive symptoms among nurses? A cross-sectional study. *Journal of Psychiatric and Mental Health nursing*. (24), 8 Pages 620–628. <http://onlinelibrary.wiley.com/doi/10.1111/jpm.12409/abstract>

Annex

Annex (1): Ethical Approval letter to Palestine Medical Complex

Al-Quds University
Jerusalem
School of Public Health



جامعة القدس
القدس
كلية الصحة العامة

الرسالة
الرقم ١٤٦٩

التاريخ: 2018/1/3

حضرة الدكتورة أمل أبو عوض المحترمة
مدير عام التعليم الصحي / وزارة الصحة الفلسطينية

الموضوع: تسهيل مهمة الطالبة أمل نجيب

تحية طيبة وبعد،،،

لقوم الطالبة أمل عطية نجيب برنامج ماجستير السياسات والإدارة الصحية/ كلية الصحة العامة/ جامعة القدس بإجراء بحث الرسالة بعنوان:

تصور حول تأثير ساعات العمل الطويلة على بقطعة التمريض وسلامة المرضى

وسبقكم الباحثة في دراسة تأثير ساعات العمل الطويلة على بقطعة التمريض وسلامة المرضى للتمريض العاملين في الوحدات الحرجة في المجتمع الطبي رام الله قسم العمليات بشكل عام وقسم العناية المركزة ووحدة العناية بالقلب، ووحدة العناية المركزة لحديثي الولادة والاستكمال البحث هي بحاجة إلى توزيع استمارة الدراسة على العاملين في تلك الأقسام. نرجو من حضرتكم السماح للطالبة بتوزيع الاستمارة على عينة الدراسة المطلوبة. علماً بأن الدراسة ستكون لأغراض البحث العلمي فقط.

وتفضلوا بقبول فائق الاحترام..

جامعة القدس
Faculty of Public Health
كلية الصحة العامة
عميد كلية الصحة العامة

نسخة: الملف

Jerusalem
P.O.Box 51000
Telefax: +970 2-2799234
Email: sphealth@admin.alquds.edu

فوق القدس / تلفاكس 02-2799234
بريد 51000 القدس
البريد الإلكتروني: sphealth@admin.alquds.edu



Ref:
Date:

عبد القادر

رقم: ٢٠١٨/١٤/١٤
تاريخ: ٢٠١٨/١٤/١٤

الأخ مدير مجمع فلسطين الطبي المحترم...
تحية واحترام...

الموضوع: تسهيل مهمة طلاب

يرجى تسهيل مهمة الطالبة: أمل عطية نجيب - ماجستير السياسات والإدارة الصحية - جامعة القدس،
في عمل مشروع بحثي بعنوان: تصور حول تأثير ساعات العمل الطويلة على بقطعة التمريض
وسلامة المرضى. لذا يرجى تسهيل مهمتها في الحصول على معلومات من خلال تعبئة استبانة من
المعرضين العاملين في قسم الجراحة وقسم العناية المركزة والقلب ووحدة العناية المركزة لحديثي الولادة،
وذلك في:

- مجمع فلسطين الطبي

علما بأنه سيتم الالتزام بمعايير البحث العلمي والحفاظ على سرية المعلومات. كما يرجى العلم ان
مشرف البحث: د. محمد شاهين.

- مع ضرورة تزويدنا بنسخة من نتائج البحث.

مع الاحترام...



مدير عام التعليم الصحي

نسخة: صيد كلية الصحة العامة المظالم/ جامعة القدس

نموذج إجازة بحثية

التاريخ ٢٠١٨ / ٢ / ١٩

التاريخ ١٩ / ٢ / ١٨٠٠

ممثلة بالميد / : أحمد عيسى نجيب ----- ويشغل وظيفة : طالبة ماجستير المساءة في الادارة
المهنية

يقدم حول تأشير سكرات العدل المطبوعة عن ترقية القضاة و سلامة المرفق

المدير التنفيذي / مجمع فلسطين الطبي

vs. Kuhlke 10.1

الدكتور أحمد البيتاوي

أحمد بن محمد بن أبي ربيعة

Annex (3): Ethical Approval letter to al-Istishari Arab hospital

Al-Quds University
Jerusalem
School of Public Health



جامعة القدس
القدس
كلية الصحة العامة

است. بالذني

التاريخ: 2018/1/8

حضرة الدكتور فتحي أبو مغلي المحترم
رئيس مجلس مستشفى الاستشاري

الموضوع: تسهيل مهمة الطالبة أمل نجيب

تحية طيبة وبعد،،

تقوم الطالبة أمل عطية نجيب برنامج ماجستير السياسات والإدارة الصحية/ كلية الصحة العامة/ جامعة القدس بإجراء بحث الرسالة بعنوان:

تصور حول تأثير ساعات العمل الطويلة على نقطة التمريض وسلامة المرضى

وستقوم الباحثة في دراسة تأثير ساعات العمل الطويلة على نقطة التمريض وسلامة المرضى للتمريض العاملين في الوحدات الجراحية في المستشفى قسم العمليات بشكل عام وقسم العناية المركزة، ووحدات العناية بالقلب، ووحدات العناية المركزة لحديثي الولادة، ولإستكمال البحث هي بحاجة إلى توزيع استمارة الدراسة على العاملين في تلك الأقسام. نرجو من حضرتكم السماح للطالبة بتوزيع الاستمارة على هيئة الدراسة المطلوبة. علماً بأن الدراسة ستكون لأغراض البحث العلمي فقط.

وتفضلوا بقبول فائق الاحترام،،


كلية الصحة العامة
Faculty of Public Health
جامعة القدس
كلية كلية الصحة العامة

مرافق طيه استمارة الدراسة.

نسخة: الملف

Annex (4): List of experts

Name	Position	Place of Work
Dr. Salam Al-khatib	Assistant Professor in Mental Health Nursing - Nursing Department	Al-Quds University-Palestine
Dr. Sumya Al-Sayej	Assistant Professor in Pediatric Nursing - Department of Nursing	Al-Quds University-Palestine
Dr. Yaseen Hayajneh	Associate Professor, Coordinator of Master of Health Administration Program, Ancell School of Business,	Western Connecticut State University, USA
Dr. Aouatef Kraiem	AHU- Department of Ergonomics and Occupational Medicine- Faculty of Medicine	University of Monastir-Tunisia
Dr. Linda D. Scott	Dean and professor in the School of Nursing	University of Wisconsin, Madison, USA

Annex (5 A):

Questionnaire Instruction Sheet (The Arabic copy)

إستبانة

حول تأثير ساعات العمل الطويلة على يقظة التمريض و سلامة المرضى في منطقة رام الله

عزيزي الممرض/ه

إن مشروع هذه الدراسة هو عمل بحث علمي لتقييم تصور تأثير ساعات العمل الطويلة على يقظة التمريض و سلامة المرضى و ذلك تحت إشراف جامعة القدس ضمن برنامج ماجستير السياسات و الإدارة الصحية.

إنني أقدر مشاركتك في مشروع البحث هذا و أهتم في هذه الدراسة برأيك حول مدى تأثير ساعات العمل الطويلة على يقظة التمريض العاملين في أقسام الرعاية الحرجة و سلامة المرضى.

هنالك (ثلاثة – خمسة) خيارات للإجابة ، يرجى إختيار الإجابة التي تصف بشكل دقيق تصورك، ليس هناك إجابة صحيحة أو خاطئة.

إن المقابلة ستستغرق 15-20 دقيقة ، و إذا ما شعرت بعدم الراحة في أي وقت بإمكانك أن تطلب وقت للإستراحة ووقف المقابلة قليلا.

سيتم التعامل بسرية تامة مع إجابتك و ستستخدم لأغراض البحث العلمي فقط و لا داعي لكتابة إسمك.

الباحثة/

أمل عطيه إبراهيم

Annex (5 B): Questionnaire (The Arabic copy)

استطلاع تصور تأثير ساعات العمل الطويلة على يقظة التمريض وسلامة المرضى في منطقة رام الله

أسئلة عامة

- 1- الجنس: ☐ ذكر ☐ أنثى
- 2- العمر: ☐ 31-22 ☐ 41-32 ☐ 51-42 ☐ أكثر من 52
- 3- المؤهل العلمي: ☐ سنتان دبلوم تمريض ☐ 3 سنوات دبلوم تمريض ☐ بكالوريوس تمريض ☐ ماجستير تمريض ☐ غير ذلك
- 4- عدد سنوات الخبرة في أقسام الرعاية الحرجة: ☐ 0-2 ☐ 3-5 ☐ 6-8 ☐ 9 سنوات أو أكثر
- 5- المسمى الوظيفي: ☐ ممرض مؤهل ☐ ممرض قانوني ☐ رئيس قسم ☐ مدير التمريض
- 6- نوع المستشفى: ☐ حكومي ☐ خاص

قسم ب 1: أنماط العمل

7- يرجى الإجابة على البنود التالية بناء على جدول عملك خلال الشهر الماضي؟ (فقط إختيار أكثر قسم تم العمل فيه)

أ- القسم:

- ☐ وحدة العناية المركزة لحديثي الولادة ☐ وحدة العناية المركزة للأطفال ☐ وحدة العناية المركزة للكبار
- ☐ وحدة العناية بالقلب ☐ قسم الطوارئ ☐ قسم العمليات
- ب -يرجى الإشارة إلى المناوبات التي عملت بها الشهر الماضي: (فقط إختيار أكثر مناوبة تم العمل فيها)
- ☐ صباحي/مساءني ☐ مساءني/ليلي ☐ صباحي/ليلي ☐ صباحي
- ج - المدة/بالأسبوع:

☐ 0-6 أيام ☐ أسبوع ☐ أسبوعين ☐ 3 أسابيع أو أكثر

د - معدل ساعات العمل اليومية:

☐ 8 ساعات ☐ 10-8 ساعات ☐ 11-13 ساعة ☐ 14 ساعة أو أكثر

هـ- معدل ساعات العمل الأسبوعي:

☐ 30 ساعة ☐ 35 ساعة ☐ 40 ساعة ☐ 45 ساعة أو أكثر

8 - أسباب العمل لساعات طويلة: ☐ أسباب عائلية ☐ مهمة إجبارية ☐ زيادة الدخل الشهري ☐ تطوع

9- كم مريض تعتني به أثناء ساعات العمل الطويلة ؟

2-0 ☐ 5-3 ☐ 8-6 ☐ 9 مرضى أو أكثر ☐

قسم ب2 : اليقظة

10- بناء على رأيك، ما عدد ساعات العمل الطويلة التي يمكن أن تؤثر على يقظتك؟

8-6 ساعات ☐ 11-9 ساعة ☐ 14-12 ساعة ☐ 15 ساعة أو أكثر ☐

المجال الاول: مجال مستوى اليقظة: 11- يرجى الإشارة إلى مستوى اليقظة خلال ساعات العمل الطويلة حول مايلي:

الفقرة	مطلقا	نادرا	في بعض الأحيان	معظم الوقت	دائما
أتناول مشروبات منشطة مثل القهوة للبقاء مستيقظا خلال فترة تسليم المناوبة					
أغفوا أثناء ساعات العمل الطويلة					
أبقى مستيقظا بسهولة خلال ساعات العمل الطويلة					
أخذ قيلولة للبقاء مستيقظا خلال ساعات العمل الطويلة					
أخذ منبهات مثل الأدوية للبقاء مستيقظا خلال فترة تسليم المناوبة					
أحتاج إلى دواء لأغفو يوم العطلة					
أستيقظ بسهولة خلال يوم العطلة					
أكافح من أجل البقاء مستيقظا خلال ساعات العمل الطويلة					
تعمل التدابير المضادة لليقظة، على سبيل المثال، القيلولة خلال فترات الإستراحة وإستخدام الكافيين، على زيادة يقظتي أثناء العمل على مدار 12 ساعة					
أشعر بالنعاس (أقل يقظة) بحلول الوقت الذي أبدأ به ساعات العمل الطويلة					
أشعر بالنعاس الذي يؤدي إلى تقليل يقظتي أثناء العمل لساعات طويلة					

قسم ج(أ): سلامة المرضى

12- خلال الشهر الماضي ، كم عدد تقارير الأحداث التي قمت بملؤها وتقديمها؟

2-0 ☐ 5-3 ☐ 8-6 ☐ 8 تقارير أو أكثر ☐

13- المجال الثاني: مجال مستوى سلامة المريض خلال ساعات العمل الطويلة

يرجى الإشارة إلى مستوى سلامة المريض خلال ساعات العمل الطويلة مع العبارات التالية حول منطقة عملك / وحدة العمل:

الفقرة	مطلقا	نادرا	في بعض الأحيان	معظم الوقت	دائما
أرتكب أخطاء في إدارة الدواء أثناء فترة ساعات العمل الطويلة					
أجد أخطاء في تمرير الكتابة المكتوبة أو الشفهية التي تلقيتها بعد الساعة 7 مساء					
يمكن تحسين سلامة المرضى من خلال التقارير الواضحة التي ترد من ممرضة المناوبة السابقة					

الفقرة	مطلقا	نادرا	في بعض الأحيان	معظم الوقت	دائما
أرتدي كمادة الوجه إذا كان لدي إنفلونزا لحماية سلامة المرضى					
أطلب المساعدة لمنع سقوط المريض، إذا كان هو / هي بحاجة إلى الانتقال إلى الحمام، الأشعة السينية... الخ، خلال ساعات العمل الطويلة					
أتأكد من جوانب السرير خلال إنتقال المريض إذا كانت مؤمنة أم لا لمنع سقوط المريض					
أقوم بتغيير وضع المريض كل ساعتين لمنع تقرحات السرير للمريض طريح الفراش					
عدم غسل اليدين يؤدي إلى تعرض المريض إلى عدوى المستشفيات					
أغسل يدي قبل وبعد إعطاء الرعاية لكل مريض					
أتفقد المعلومات الهامة الخاصة برعاية المرضى أثناء تغيرات المناوبة					
يوجد خطر خلال الفترة الإنتقالية للمناوبة على سلامة المرضى في المستشفى					

قسم ج(ب): سلامة المرضى/ تكرار الأحداث المبلغ عنها

14- المجال الثالث : سلامة المرضى/ تكرار الأحداث المبلغ عنها

الرجاء الإشارة إلى عدد المرات التي يتم الإبلاغ عن حدوث خطأ في الوحدة التي تعمل بها في المستشفى؟

مطلقا	نادرا	في بعض الأحيان	معظم الوقت	دائما
يتم الإبلاغ عند حدوث خطأ تم تداركه وتصحيحه قبل أن يؤثر على المريض				
يتم الإبلاغ عندما يتم ارتكاب خطأ حتى لو لم يكن يؤدي المريض.				
يتم الإبلاغ عند ارتكاب خطأ يمكن أن يضر المريض، ولكن لا يهدد حياته				

15-المجال الرابع : المهام التي تتأثر بمستوى اليقظة :في رأيك، ما هي المهام التي تتأثر بمستوى اليقظة؟

المهمة	تؤثر	لا تؤثر	لا أعلم
إدارة الأدوية			
مراقبة العلامات الحيوية للمرضى			
إعداد المرضى للعمليات الجراحية			
التواصل مع الفريق الطبي حول الحالة المرضية للمريض			
تثقيف المرضى حول الوقاية من الامراض			
تقييم و رصد الأجهزة			
إستكمال جميع أوامر الطبيب، وإجراء العلاجات والاختبارات للمرضى			

شكرا لك لإتمامك هذا الإستطلاع

Annex (6 A):

Questionnaire Instruction Sheet (The English copy)

Questionnaire

Perception of the effects of critical care nurses` long working hours on vigilance and patients` safety in Ramallah District

Dear Nurses,

I appreciate your participation in this evaluation research as a part of fulfillment requirements for the degree of Master of Health Policies at Al-Quds University. The study aims to assess the effects of long working hours on nurses` vigilance and patients` safety.

There are three-five scales to choose from your answer; please select the scale the best represents your perception. Filling the questionnaire takes 15-20 minutes, if you feel uncomfortable, please ask to take rest and stop the interview.

If you accept to participate, you have the right to withdraw at any time .Confidently will be provided to your answers and used just for scientific purpose, no need to write your name.

The Research

Amal Ibrahim

Annex (6 B): Questionnaire (The English copy)

Perception of the effects of critical care nurses' long working hours on Vigilance and Patients' Safety in Ramallah district.

SECTION 1: DEMOGRAPHIC INFORMATION

1. What is your gender?

☐ Female ☐ Male

2. What is your Age?

☐ 22-31 ☐ 32-41 ☐ 42-51 ☐ 52 or more

3. What is your level of your nursing education?

☐ 2 years diploma ☐ 3years diploma ☐ BS of Nursing
☐ Master of nursing ☐ above

4. How long have you worked in critical care area?

☐ 0-2 ☐ 3-5 year ☐ 6-8 years ☐ 9 or more

5. What is your current Position?

☐ Licensed practical nurse ☐ Licensed Registered Nurse
☐ Head nurse ☐ Director of Nursing

6. Where do you work?

☐ Istishari (Private sector) ☐ Palestine Medical complex (Governmental sector)

SECTION 2A: Work Patterns

7- Please answer the following items based on your work schedule for the last month?:

A) - Department Type: (choose the most worked at department only)

☐ Adult ICU ☐ Neonate ICU ☐ Pediatric ICU
☐ CCU ☐ Emergency ☐ Operating Room

B) - Shifts Type: (choose the most worked at shift only)

☐ Day/ Evening ☐ Evening/ Night ☐ Day /Night ☐ Straight day

C) - Duration/ days and Weeks:

☐ 0-6 days ☐ one week ☐ 2 weeks ☐ 3 weeks or more

D) - Daily working hours:

☐ 8 hours ☐ 8-10 hours ☐ 11-13 hours ☐ 14 or more

E) - Weekly Working hours:

☐ 30 hours ☐ 35 hours ☐ 40 hours ☐ 45 hours or more

8. Reasons for working extended shifts

☐ Family reason ☐ compulsory ☐ more income ☐ voluntary

9. How many Patients are you Assigned to care for during your long working hours?

☐ 0-2 ☐ 3-5 ☐ 6-8 ☐ 9 or more

SECTION 2B: Vigilance

10. Based on your opinion, what is considered to be long working hours that could affects your vigilance?

☐ 6-8 hours ☐ 9-11 hours ☐ 12-14 hours ☐ 15 or more

11. Field 1: Level of vigilance: Please indicate your level of vigilance during the long working hours about the following:

	Never (1)	Rarely (2)	Sometimes (3)	Most of the time (4)	Always (5)
I take stimulant drinks such as coffee to stay awake during the extended shift					
I fall asleep During the extended shift					
I stay awake easily during the extended shift					
I take a nap to stay awake During the extended shift					
during the extend shift, I take stimulant medication					
I need medication To fall asleep at day off					
I wake up easily during at the day off					
during extended shift I struggle to stay awake					
Countermeasures, e.g., naps during break periods & use of caffeine, increase my alertness during working 12-hour shifts					
I feel sleepy (less vigilant) by the time I start the extended shift					
Iam more likely to feel sleepiness, and reduced performance during an extended shift					

SECTION 3A: Patient Safety

12. in the past month, how many event reports have you filled out and submitted?

☐ 0-2 ☐ 3 - 5 ☐ 6-8 ☐ 9 or more

13. Please indicate the patient safety level during the long working hours with the following statements about your work area/unit.

Item	Never	Rarely	Sometimes	Most of the time	Always
I made a medication administration error during the extended shift					
I find mistakes in nursing written or verbal hand-over that I received after 7 p.m. during the extended shift					
I believe that patient safety could be improved with clear reports received from the previous shift nurse					
I always wear a face mask if I have flu to protect patient safety					
To prevent patient falling if they need transition to bathroom, x-ray...etc , I always ask for help during the extended shift					
During patients transition I usually check the bed rails if they're locked to prevent patient fall					

I usually change patients' position every two hours (to prevent bed sore for bedridden patient)					
Improper hand washing always spread nosocomial infection among patients					
I wash my hands before and after giving care to each patient					
I check out important information about patient care during shifts					
There is a risk during the transition period of the rotation of patient safety in the hospital					

SECTION 3B: Patient Safety /Frequency of Events Reported

14. Field 3: Patient Safety / Frequency of Reported Events: In your hospital work area/unit, when the following mistakes happen, how often are they reported?

	Never	Rarely	Sometimes	Most of the time	always
When a mistake is made, but is caught and corrected before affecting The patient, how often is this reported?					
When a mistake is made, but has no potential to harm the patient, how Often is this reported?					
When a mistake is made that could Harm the patient, but does not life threatening, how often is this reported?					

15. - The fourth field Tasks that are affected by the level of vigilance: in your opinion, do the following duties affect vigilance and patients' safety during log working hours?

List of Task	Yes	NO	Don't Know
Medications administration			
Monitor patients' vital signs			
Prepare patients for surgery			
Communication with Medical team about patients condition			
Educating patients on disease prevention			
Evaluating and monitoring devises			
Complete all physician orders ,conduct treatments and tests for patients			

THANK YOU FOR COMPLETING THIS SURVEY

Annex (7): Summary of literature

Author (s) /Year	Aim	Sample size	Study Design	Instruments	Results	Comments
1-Kim W et al (2016) South Korea	This study aimed to investigate the association between night or shift work status and (health related quality of life)of economically active women and to analyze how marital status interplays in the objected relationship	A total of 2238 working women were included for analysis	A quantitative cross-sectional study was used	Questionnaire	Results showed that importance of monitoring the HRQoL status of women working night and rotating shifts as these individuals may be comparatively vulnerable to reduced HRQoL.	The finding of this study highlights personal issues that should be taken in accordance to nurses` quality of life and equality between genders in work status
2-Allen A et al (2014) British Columbia	To assess how nurses` sleep patterns are affected by work schedules and other factors	20 Critical care nurses	Quantitative study	sleep and activity logs , demographic survey and an actigraph	Degree of sleep deprivation adversely affects patients` safety and needs further study	Findings stressed a variation in nurses` coping experience according to the long working hours and their sleep deprivation.
3-Silva K et al (2017) Brazil	To Analyze the sleep-wake cycle and the quality of sleep of nurses working in shifts in a university hospital	total of 104 nurses	Cross-sectional	Pittsburgh Sleep Quality Index (PSQI) and questionnaire	Lack of sports activities and the shift work schedule may have influenced the nurses` quality of sleep	I agree with this study and assert that fair working schedule and doing sport activities will enhance nurses` quality of life
4-Pilcher JJ et al (2013) USA	To determine if a change in decision making occurred across a 12-h day shift in a sample of registered nurses	The participants were nurses working a 12-h day shift (7 a.m.–7 p.m.)	Quantitative	Questionnaire at the beginning and end of the shift	The results indicates that nurses` significantly changed their decision making policies from the beginning to the end of the work shift and also became significantly less alert and more stressed. However, there was no correlation between decision- making and reported alertness and stress	One possible underlying mechanism responsible for the changes seen across the shift could be the ability to maintain attention also there are a variety of negative outcomes associated with shift work
5-Chang YS et al (2013) Taiwan	Explore changes in cognitive function, sleep propensity, and sleep related hormones ,investigates the factors related to the ability to maintain wakefulness in the daytime after one block of fast forward rotating shift work	Twenty female nurses	Quantitative	MWT, SAI, SSS, UAT, WCT and Multiple Sleep Latency Test	Anxiety state and neuropsychological tasks, including executive function, attention, perceptual and motor abilities were not affected during the daytime sleep restriction period. No significant changes sleep hormones throughout daytime period	A well designed study focused on psychological aspects on nurses` personality upon to long working hours and further researches must be done to handle this issue
6-Haluza D et al (2017) Austria	To investigate if adequate recovery opportunities are crucial for preventing long term health effects of acute load reactions in response to stressful work	48 nurses (89.6% females) working in three public Austrian nursing homes	Quantitative	standardized questionnaires	Understanding the concepts of all static loads, need for recovery and fatigue is essential to develop personalized working schedules	Three rest days are necessary for full recovery after two consecutive 12 hours shifts and adequate that will enhance nurses to maintain caring attitudes to patient safety

7-Zhang Y et al (2017) USA	To examine the role of sleep disturbances in the association between work-family conflict and depressive symptoms in nurses	397 nurses	A cross sectional study	Questionnaire	Significant association between work-family conflict and depressive symptoms among nurses was observed	Organizations should include sleep education and training as a component of workplace health promotion to mitigate the effect of work-family conflict and promote overall health in nurses
8-Tao FM et al (2016) China	Aimed to identify influencing factors for sleep quality among shift-working nurses based on a three-factor scoring model that included sleep efficacy, sleep quality and daily dysfunction	513 nurses in a hospital in Shanghai, China	cross sectional study	Pittsburgh Sleep Quality Index (PSQI) and a self-reported questionnaire	Performing current shift work and performing shift work previously were significantly associated with poor sleep quality	An appropriate arrangement and intervention strategies are needed in order to improve sleep quality among shift-working nurses
9-Kazemi R et al (2016) Iran	Examines cognitive performance, sleepiness, and sleep quality among petrochemical control room shift workers	60 male control room operators working in the Petrochemical Complex, the largest petrochemical center located in southern Iran	Descriptive study	questionnaire	Participants had low sleep quality on both day and night shifts, also significant differences between the day and night shifts in terms of subjective sleep quality and quantity. Long working hours result in fatigue, irregularities in the circadian rhythm and the cycle of sleep, induced cognitive performance decline at the end of both day and night shifts, and increased sleepiness in night shift	It seems necessary to take ergonomic measures such as planning for more appropriate shift work and reducing working hours
10-Stimpfel WA et al (2013) USA	Describe the shift lengths of pediatric nurses and measured the association of shift length with nurse job outcomes, nurse-reported patient outcomes, nurse-assessed safety and quality of care in hospitals	3,710 registered nurses who worked in 342 acute care hospitals that treated children	cross sectional study	Questionnaire	The study results pointed that nurses who worked extended shifts of >13 hours reported worse job outcomes and lower quality and safety for patients compared to nurses who worked 8 hour shifts	allocating resources for nursing to improve working hours may be a productive strategy for administrators to improve the health and well-being of pediatric
11-Portela F L et al (2015) Brazil	Assessed the association between weekly working hours and self-rated health of Nurses	A total of 3,229 nurses (82.7% of the eligible group)	cross sectional study	self-administered multidimensional questionnaire	As results, there was no significant association between long working hours and poor self-rated health	Urgent need to promote interventions in order to reduce the number of nurses multiple jobs and contribute to mitigate potential effects on the workers health & the quality of care in hospitals
12-Matre D et al (2017) Norway	To determine whether shift workers exhibit increased perception of experimentally induced pain after working night shifts	Fifty-three nurses in rotating shift work participated	cross sectional study	Questionnaire	The sensitivity to electrically induced pain, heat pain, cold pain, pressure pain and pain inhibition was determined experimentally in each sleep condition; Sleepiness and vigilance were also assessed	Explanations for the differential effect on different pain modalities should be a focus for future studies

13-Rajaratnam et al(2013) Australia	To Assess the relationships between sleepiness and the incidence of adverse driving events in nurses commuting to and from night and rotating shifts	Rotating shift nurses	descriptive study	Questionnaire	Sleepiness & drive events were significantly higher during night shifts than before night shifts. Strong associations between objective drowsiness and increased odds of driving after night shifts, were found	shift-working nurses experience high levels of drowsiness, which are associated with impaired driving performance following night shift work
14-Karhula K et al (2013) Finland	To explore the associations of job strain with sleep and alertness of shift working female nurses and nursing assistants	95 health workers	descriptive study	Sleep diary and actigraphy. (PVT) was performed during one pre-selected morning and night shift and a day off	Job strain is associated with difficulties initiating sleep and reduced psychomotor vigilance in night shifts. Shift working contributed to impaired sleep in both high and low job strain group	Individual and organization-based actions are needed to promote sufficient sleep in shift working nurses, especially with high job strain
15-Brown GJ et al (2013) USA	To measure subjective sleepiness at work in hospital nurses	Hospital registered nurses (N=40) working 12-h shifts	Quantitative	Performance vigilance task (PVT) at the end of the shift. The Horne- Ostberg Questionnaire, ESS GS D Scale, and Cleveland Sleep Habits	Factors produced higher sleepiness; included full working night shifts, especially for those with “morning” trait; working sequential night shifts; having low physical and mental work demands and low time pressure having concomitant organic sleep disorders; and having greater “trait” sleepiness	partial support for using the Karolinska Sleepiness Scale in the recalled format based on multiple tests of predictive validity
16-Bae HS et al (2016) USA	To explore the nature and prevalence of nurse practitioner overtime, work hours, and their relationship to practice within nurse practitioner work Conditions	9010 Nurse practitioner	Quantitative	Questionnaire	NPs who worked more than 40 h/week either had hierarchical relationships with them or with the physician examined and signed off on patients whom the NP had examined	further study is indicated to assess the potential impact of work hours/overtime on NP roles and patient outcomes
17-Liu Ch et al (2013) Taiwan	to explore changes in cognitive functions, sleep propensity, and sleep-related hormones (growth hormone, cortisol, prolactin, and thyrotropin) in the daytime of nurses working on fast rotating shifts	20 nurses who worked two consecutive night shifts and 23 off-duty nurses from an acute psychiatric ward	Quantitative	MWT, SSS,VTT, WCS test, MSL test	nurses working on fast rotating shifts overestimate the cognitive functions and capacity of maintaining wakefulness following daytime sleep restriction	Attention performance depended on the attentive load requirement and was possibly related to TSH level
18-Matsumoto et al (2014) Japan	To evaluates sleep quality of shift-working nurses	Nineteen shift-working nurses	Quantitative	Actiwatch 2, (a watch-like actigraphy device designed to measure sleep and wakefulness based on the amount of	Negative correlation was found between the perceived sleep quality of nap 2 with demographic characteristics .positive correlations between the perceived sleep quality of sleep and percent sleep, and the perceived sleep quality of nap and	Improving the sleep quality of daytime napping after the night shift is necessary for nurses with children

				movement)	sleep efficiency	
19-Anbazhagan et al (2016) India	To assessed the prevalence of Shift work disorder (SWD) and identified related health problems among nurses	130 nurses were selected for the study	Cross sectional	Questionnaire	A significant association of SWD with increasing age, more number of nights worked in a year and longer duration of working hours	A high prevalence of SWD symptoms calls for a focus on the antecedents of work related sleep problems and appropriate intervention, such as behavioral changes, clockwise rotating shifts, and treatment, were founded and needed for further researches
20-Fernandez DJ et al(2013) Brazil	To analyze the differences between genders in the description in the professional, domestic and total work hours and assess its association with health-related behavior among nurses	All nurses working with assistance were considered eligible (n=2,279)	transversal study	Questionnaire	Men and women showed significant differences in relation to working hours. Female showed longer domestic and total work hours when compared to men .number of hours spent on professional work was higher among men	Needed actions for improving health promotion in this occupational group and the importance of assessing the impact of long working hours on the health of workers
21-Turnock R et al (2015) UK	To explore evidence regarding work schedules and error and how it related to patient safety and quality of care	group of critical care nurses	Quantitative	Questionnaire	Positive factors like improved planning and prioritizing care, improved relationships with patients/relatives, good-quality time off work and ease of travelling to work were found	nurses work 12 hours there are only two hand-off periods, this decreases the potential for errors associated with poor communication at hand-off
22-Stanojevic.C et al (2016) Serbia	To review current knowledge and attitudes concerning the impact of sleep disorders on health and cognitive functions among the members of the nursing staff	Nursing Staff	descriptive study	Questionnaire	Too long or repeated shifts reduce the opportunity for sleep; shorten recovery time in nurses, thus endangering their safety and health as well as the quality of care and patients' safety	Bearing in mind the significance of the problem to conduct the surveys of sleep quality and health of nurses as well in order to tackle this issue which is insufficiently recognized
23-Ramadan, et al (2014) Saudi Arabia	To Determine the influence of sleep deprivation on the occurrence of errors by registered nurses working in night shift in intensive care departments	138 nurses	quantitative study	Questionnaire	Registered nurses who were sleep deprived had worse sleep quality in terms of high PSQI than those who were not. None of the demographic variables was statistically significant, not providing evidence that these variables may explain odds for being sleep deprived in the population	Work schedule changes, offering shorter periods of time on night shift and less working hours in the week may lead to better sleep quality and less sleep deprivation
24-Oguma Y et al., (2013) Japan	Investigate the effects of rotating shift schedule on nurses' vigilance by comparing vigilance before and after day shift duties and night shift duties	13 rotating-shift female nurses	quantitative study	actigraphy and the psychomotor vigilance task	Significant individual difference in vigilance was observed for day shifts and a significant decrease of vigilance was detected after night shift duty, also a wider spread of day by day total sleep time was associated with a	Rotating shift may have a negative impact on vigilance during night shifts & irregular duration of sleep may reduce vigilance during day shifts. Negative effects of rotating shifts occur not only on night shifts at day

					longer mean reaction time	shifts if sleep length varies day by day.
25-Alagesan M et al (2017) India	To find out the prevalence of sleep deprivation and its impact on cognition among shift working nurses	97 female and three male healthy nurses who were on a rotating work schedule	Cross sectional study	Questionnaire	Poor sleep quality was observed among of shift working nurses. During the night, 32% made more mathematical errors. It was also found that, 71%, 83% and 68% of the nurses scored lesser during night in the Strop's color test, vigilance test and memory tests respectively	Cognitive performance was found to be impaired among shift working nurses, due to poor sleep quality and decreased alertness during wake state. Shift work poses significant cognitive risks in work performance of nurses
26-Batak T et al (2013) Serbia	To analyze the presence and level of fatigue in nurses and assessed the impact of shift work on fatigue level	120 nurses	cross-sectional study	Questionnaire	Shift workers subjectively perceived fatigue level among shift workers was significantly higher on each item of the questionnaire than non shift workers	Develop appropriate patterns of working schedule to reduce problems related to the dynamic of rotation and length of shifts
27-Al-Ameri et al (2017) Iraq	to find out the impact of night shift on nurses quality of life; and to find out any relationship between the quality of life and some demographic characteristics such as age, gender, marital status, level of education, and duration of career	70 night shift nurses	descriptive study	Questionnaire	The male nurses had higher levels of quality of life than female nurses did and the married nurses are more likely to have lower levels of quality of life than unmarried did	Provide adequate off-duty hours to let an uninterrupted sleep cycle of at least 8 h a day, which may affect nurses' daily life at home. Also use permanent shift assignments, which may diminish tiredness effects, instead of rotating shift duties
28-Griffith R et al (2014) UK	describe shift patterns of EU nurse, investigate whether shift length and overtime hours is associated with nurse-reported care quality, safety, and care left undone	31,627 registered nurses in general medical/surgical units across Europe	cross sectional study		Shift length varied between Countries. Nurses working for ≥ 12 hours were more likely to poor or failing patient safety. Also working overtime	Policies to adopt a 12-hour nursing shift pattern should proceed. Use of overtime working to mitigate staffing shortages or increase flexibility may also incur additional risk to quality.
29-Yeon U et al (2014) South Korea	To compare job satisfaction, quality of life, incident report rate and overtime hours for 12-hour shifts and for 8-hour shifts in a pediatric intensive care unit	36 staff nurses	descriptive cross sectional study	self-administrated questionnaires	After 12-hour shifts job satisfaction significantly increased and QOL was higher for nurses on 12-hour shifts compared to 8-hour. No statistically significant change in incident report rate and the overtimes decreased	12-hour shift can be an effective ways of scheduling to increase job satisfaction and quality of life without increasing incidents or prolonged overtime work hours
30-Alshahrani s et al (2017) Saudi Arabia	To evaluate sleep quality and daytime sleepiness in health care professionals who are performing Shift work	510 health care Workers shift workers	cross-sectional study	Pittsburgh Sleep Quality Index (PSQI) and the Epworth Sleepiness	the PSQI global score ($p < 0.001$) and the total ESS score ($p = 0.003$) were significantly higher in shift work health care professionals	Health care professionals performing shift work have PSQI and ESS scores slightly higher than non-shift work professionals
31- Sloane DM et al 2013 USA	To study the relationship of long nursing Shifts with Mean Burnout and Patient Dissatisfaction	f 22,275 registered nurses from the Multi-State Nursing Care and Patient Safety	cross-sectional study	self-administrated questionnaires	80 % nurses were satisfied with scheduling practices, However, as the proportion of hospital nurses working shifts of more than 13 hours increased, patients' dissatisfaction	Policies regulating work hours for nurses, similar to those set for resident physicians, may be warranted. Nursing leaders should also encourage workplace cultures that respect nurses'

		Study			with care increased. Nurses working 10 hours or more were up to two and a half times more likely than nurses working shorter shifts to experience burnout and job dissatisfaction and to intend to leave the job. Extended shifts undermine nurses' well-being, may result in expensive job turnover, and can negatively affect patient care	days off and vacation time, promote nurses' prompt departure at the end of a shift, and allow nurses to refuse to work overtime without retribution.
--	--	-------	--	--	--	--

